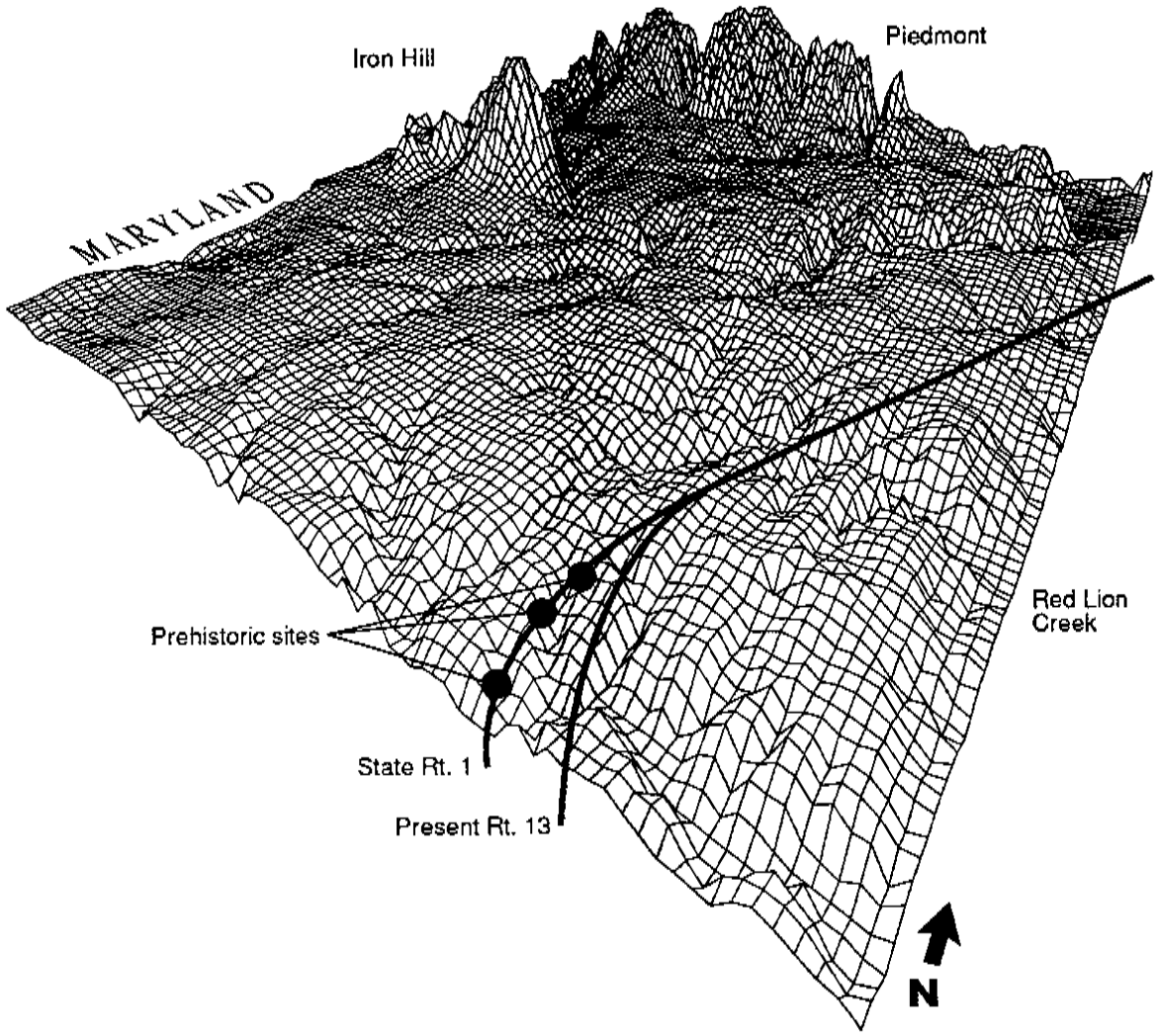
PHASE II ARCHAEOLOGICAL DISCOVERIES IN THE CHESAPEAKE AND DELAWARE CANAL SECTION OF THE STATE ROUTE 1 CORRIDOR, NEW CASTLE COUNTY, DELAWARE



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Delaware Department of Transportation Archaeology Series No. 102

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PHASE II ARCHAEOLOGICAL DISCOVERIES IN THE CHESAPEAKE AND DELAWARE CANAL SECTION OF THE STATE ROUTE 1 CORRIDOR, NEW CASTLE COUNTY, DELAWARE

DELDOT PROJECT 89-110-05 DELDOT ARCHAEOLOGY SERIES NO. 102

FHWA FEDERAL AID PROJECT F-1003(9)

By

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Submitted to

**U.S. DEPARTMENT OF TRANSPORTATION
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and

**DELAWARE DEPARTMENT OF STATE
Division of Historical and Cultural Affairs
State Historic Preservation Office**

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**Eugene E. Abbott
Director of Planning**

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ABSTRACT

Archaeological test excavations at eight prehistoric sites and one historic site within the right-of-way of the Chesapeake and Delaware Canal section of the State Route 1 Corridor project are described. Four prehistoric sites were found to be the remains of small, ephemeral occupations dating to the Woodland I time period, ca. 3,000 B.C. - A.D. 1,000. Plowing and other activities have destroyed the sites, and no further archaeological research is recommended. Two prehistoric sites (Parkway Gravel - 7NC-G-100, and Dragon Run North B - 7NC-G-104) yielded substantial amounts of cultural material. Use of both sites was predominately during the Woodland I Period. Contact Period occupation of the Parkway Gravel site may be indicated by a flaked, olive glass bottle bottom and several gunflints. The Dragon Run North B site is unusual in the amount of ironstone used for lithic raw materials. Reexamination of ironstone use and distribution in the region suggests that ironstone crops out at the eastern margin of the Upper Coastal Plain where streams are deeply incised into the Columbia Geological Formation. Both the Parkway Gravel and the Dragon Run North B sites were severely damaged by plowing and soil erosion. Further archaeological research is not recommended. Two other prehistoric sites (Wrangle Hill South - 7NC-G-105, and Snapp - 7NC-G-101) were more substantial than the other six prehistoric sites. Furthermore both site shad many intact subsurface features and soils undamaged by plowing. The sites were both occupied during the Woodland I and II periods (ca. 3,000 B.C. - A.D. 1600). Nassawango ceramics, a rare type in northern Delaware and one associated with the Delmarva Adena complex, were found at the Wrangle Hill South site. The Wrangle Hill South site also showed heavy use of ironstone. The Snapp site is a large site with abundant fire-cracked rock suggesting many cooking features - thus, a large village. Unplowed wooded areas hold the promise of undisturbed cultural features and activity areas. Both the Wrangle Hill South and Snapp sites are recommended for further research as they are eligible for nomination to the National Register of Historic Places. Archaeological testing of the Woodville Farm Historical site (7NC-E-98) located a variety of subsurface features dating to the eighteenth, nineteenth, and twentieth centuries. Two major areas of activity were identified: the domestic activity area around the house foundation itself, and the farmyard. The abundance of artifacts and features and the good preservation of the remains makes the site significant. Phase III data recovery excavations are recommended at the Snapp and Wrangle Hill South prehistoric sites, and at the Woodville Farm Historical site.

DelDOT Archaeological Series Index Information

This form is intended to provide information on the contents of this volume for indexing. It is also intended for researchers to use to check the research methods and topics included in this volume.

Report Title: **PHASE II ARCHAEOLOGICAL DISCOVERIES IN THE CHESAPEAKE AND DELAWARE CANAL SECTION OF THE STATE ROUTE 1 CORRIDOR, NEW CASTLE COUNTY, DELAWARE**

DelDOT Report Number: **102**

Level of Investigations: [Phase I, II, III, Planning Survey, Specialized Study]

Phase II

Basic Time Periods Covered:

____	All prehistoric
X	Mainly prehistoric, some historic
____	Equal coverage of prehistoric and historic
____	Mainly historic, some prehistoric
____	All historic

Site Contexts:

	Prehistoric	Historic
Plow zone/disturbed surface soils	X	X
Intact features	X	X
Buried artifact-bearing strata		

List up to five major time periods or site types

1. **ALL PREHISTORIC TIME PERIODS**
2. **CONTACT PERIOD**
3. **BASE CAMPS**
4. **PROCUREMENT SITES**
5. **NINETEENTH CENTURY FARMSTEAD**

List up to eight major topics covered in Conclusions and Discussions of Results

1. **PROCUREMENT SITE DISTRIBUTION**

2. **CONTACT PERIOD SITES**
3. **IRONSTONE USE**
4. **FLAKE ATTRIBUTE COMPARISONS**

Specialized Analyses Undertaken

	Prehistoric	Historic
Blood Residue	X	
Ceramic Chronology		
Ceramic Vessel Surface Alterations		
Cordage Twists from Ceramic Impressions		
Faunal Analysis		
Flake Attributes	X	
Floral Analysis		
Flotation		
Geomorphology and Pedology	X	
Glass Analysis		
HABS Documentation		
HAER Documentation		
Historic Architecture		
Informant Interviews		X
Leather Analysis		
Miller Ceramic Index		
Mortar Analysis		
Palynology		
Projectile Point Chronology		
Projectile Point Function		
Radiocarbon Dates		
Soil Chemistry		
Spatial Distribution of Artifacts	X	X
Stone Tool Functional Analysis	X	
Wood Identification		

List up to 5 other specialized analyses not listed above:

1. **FLAKED GLASS ANALYSIS**

Geographic Area Covered

__X__ New Castle County
____ Kent County
____ Sussex County
____ All State

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The ideas and interpretations expressed in this report owe much to the staff of the University of Delaware Center for Archaeological Research. In particular, Wade Catts, Barbara Hsiao Silber, Glen Mellin, Lynn Riley, and Scott Watson participated in discussions, supplied information, and in other innumerable ways contributed to this report.

Cover Illustration: The computer-generated three-dimensional view of northern Delaware shows a "bird's-eye" view looking from the vicinity of the northern end of the State Route I Corridor near Bear, Delaware. The flatter Coastal Plain can be seen in the foreground and the more mountainous Piedmont Uplands of northern Delaware, north of Newark, Delaware, are visible in the background.

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INTRODUCTION

The purpose of this report is to describe and present the results of Phase II archaeological research of the Chesapeake and Delaware Canal (C&D Canal) bridge replacement section of the State Route 1 Corridor in New Castle County, Delaware (Figure 1). As part of archaeological research into the entire 46 mile long State Route 1 highway project, Phase I archaeological survey of a 6.4 mile section of the proposed highway right-of-way (Figure 2) identified nine archaeological sites that required further examination to determine their eligibility for the National Register of Historic Places for compliance under section 106 of the National Historic Preservation Act (Hodny, Bachman, and Custer 1989). This report is the second in a series on archaeological research of the C&D Canal section of State Route 1 and continues the work of Hodny, Bachman, and Custer (1989). Future reports will be issued for final excavations of any significant sites impacted by highway construction.

HISTORY OF RESEARCH

Archaeological research of the State Route 1 Corridor began in the early 1980s with a preliminary study of the archaeological potential for the large area within which the proposed highway would be located (Custer et al. 1984; Custer and Bachman 1986; Custer, Bachman, and Grettler 1986). Predictive models were developed for prehistoric archaeological sites and documents and maps were studied to identify historical occupations and land use. After a specific corridor for the highway was selected, archaeological field work began. Sites were identified on the basis of shovel test pitting and walk-over of plowed fields. The presence of prehistoric artifacts, cultural soils, or historical debris characterize archaeological sites. The State Route 1 Corridor has been studied in segments defined by the Delaware Highway Department (DelDOT) construction schedule (Bachman, Grettler and Custer 1988; Custer, Bachman, and Grettler 1987; Grettler, Bachman, and Custer 1991; Hodny, Bachman, and Custer 1989). Phase II studies follow site identification and investigate the extent, depth, and preservation of archaeological deposits. From the Phase II studies, the significance of a site and its potential for nomination to the National Register of Historic Places can be assessed. If a site is significant to prehistory or history, then steps must be taken to either protect the site from damage by construction or the information contained in the archaeological deposits must be preserved by archaeological excavation and analysis. This report presents the results of Phase II investigations at nine sites in the State Route 1 Corridor right-of-way.

ENVIRONMENTAL SETTING

Geology and Geomorphology

The study area is located on Delaware's Upper Coastal Plain (Figure 3), which extends from the Piedmont Fall Line to the Smyrna River (Custer 1984; Custer and Bachman 1986). The High

FIGURE 1

Location of the State Route 1 Corridor

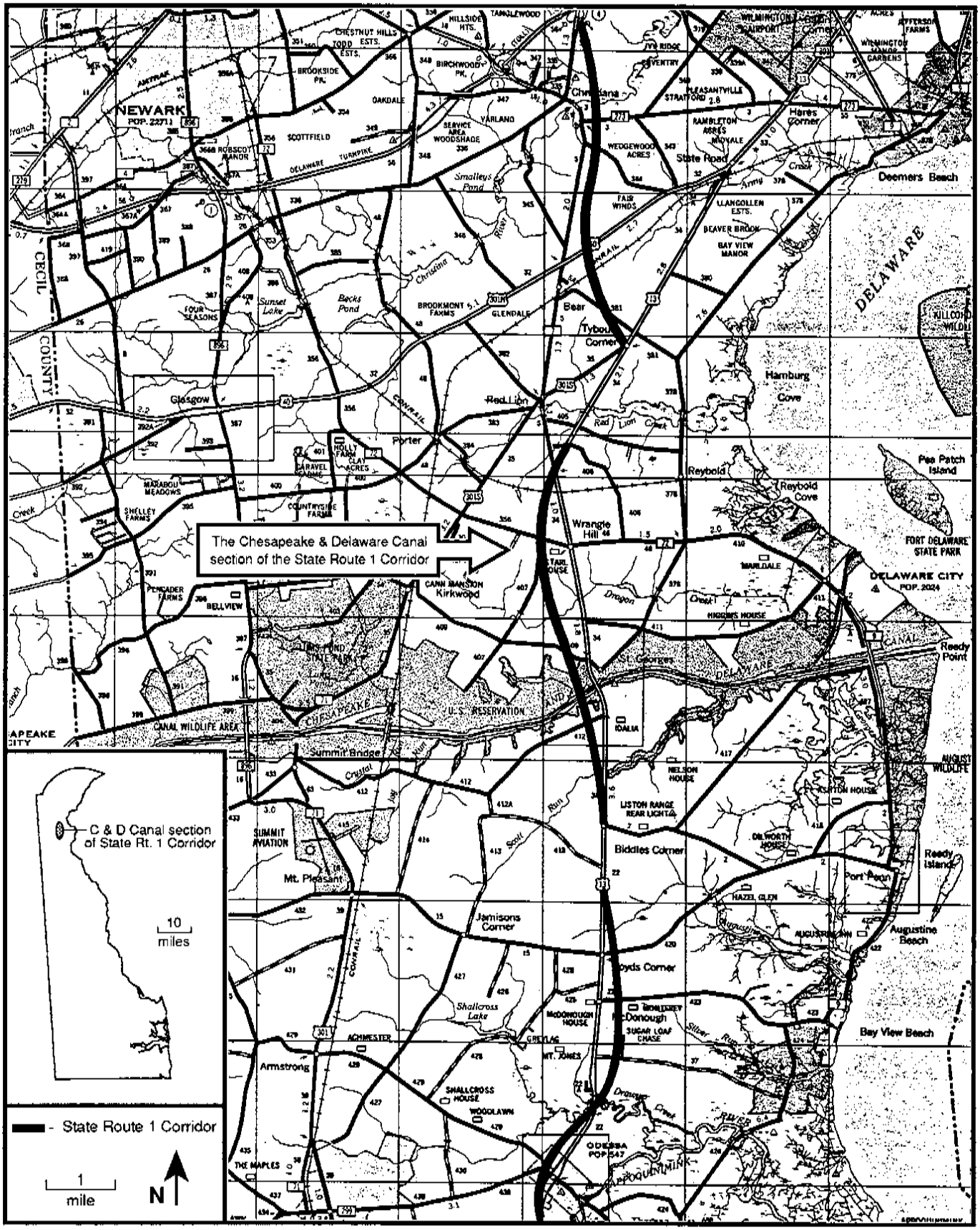
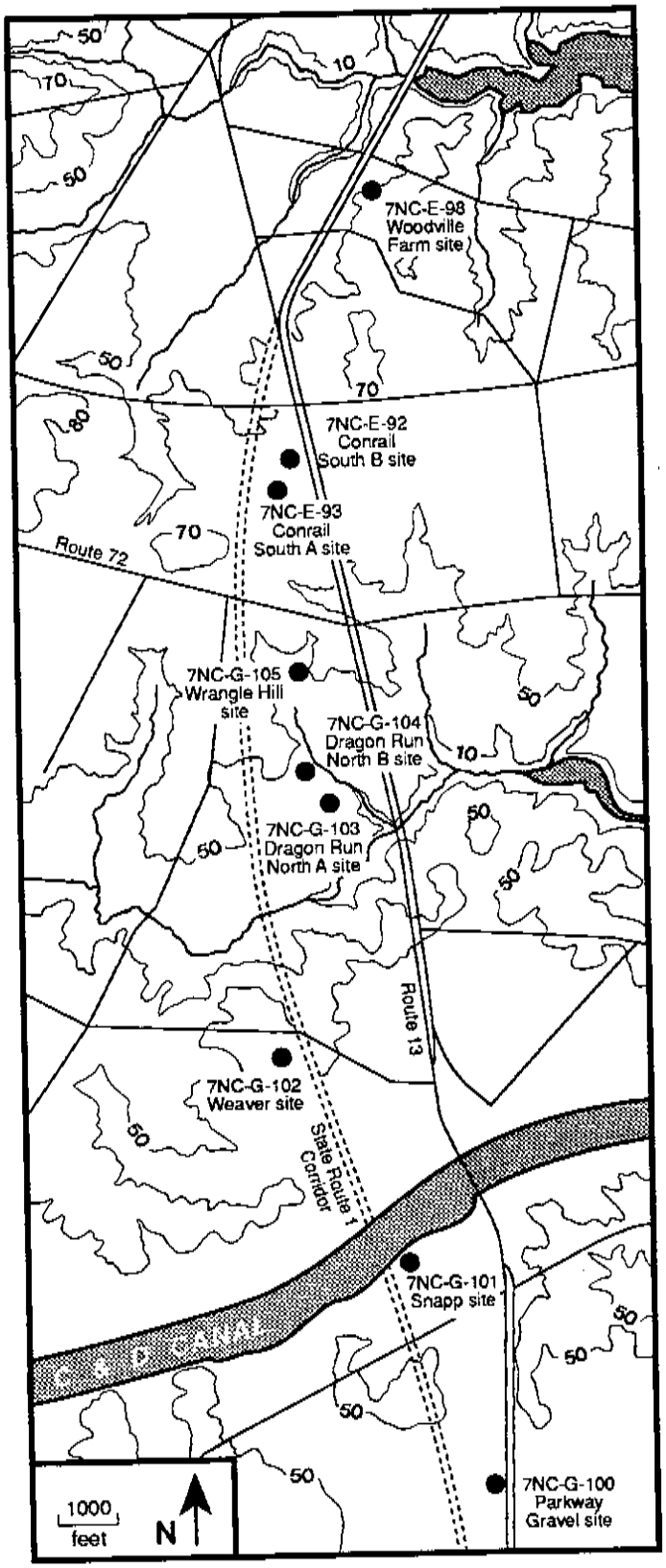


FIGURE 2

Location of the Chesapeake and Delaware Canal Segment of the State Route 1 Corridor

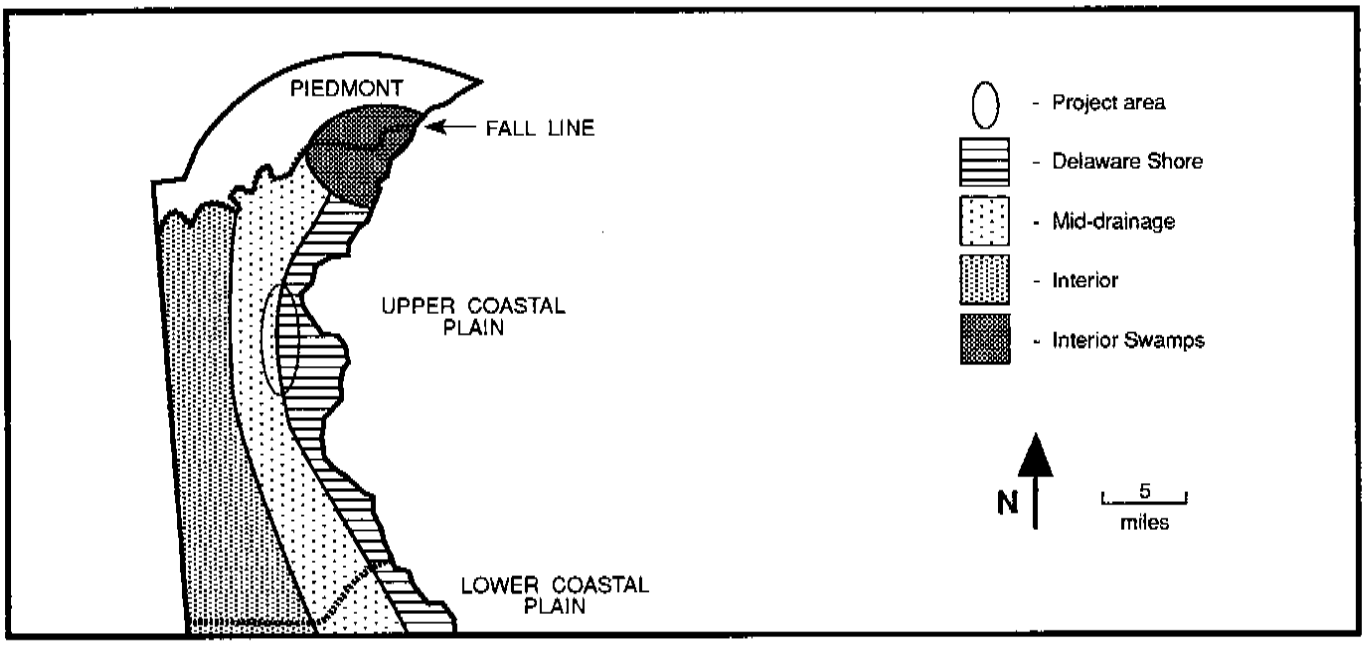


Coastal Plain is formed by the southeastern extension of coarse gravels of Pleistocene age (2 million years old and younger) into Delaware known as the Columbia Formation (Jordan 1964:40). The topography is rolling and elevation differences range up to 16 meters (50 feet) where headlands bordering streams overlook adjacent floodplain marshes. The elevation differences are sufficient to support different plant communities and animal species (Braun 1967:246-247). Watercourses are deeply incised and filled with a wedge of relatively recent sediments that thickens towards Delaware Bay (Kraft et al. 1976:13). Most streams are tidal and the freshwater/ saltwater mix allows for a wide range of resources. Soils form a mosaic of well-drained and poorly-drained settings distributed across the landscape. The Upper Coastal Plain can be divided into several zones running parallel to Delaware Bay (Figure 3). The study area straddles the border between the Delaware Shore and the Mid-drainage subdivisions (Hodny, Bachman, and Custer 1989:7-9).

Delaware Shore: The Delaware Shore zone includes terrace remnants of the Delaware River and tidal marshes that fringe the Delaware River and Delaware Bay. Marshes dominate the area and often extend well inland from the river and bay shore. Soils in the area are generally poorly drained; however, pockets of well-drained soils may be found on higher elevations. The State Route 1 Corridor study area under consideration here includes only the western extensions of this zone. Only the eastern edges of the project area are included in the Delaware Shore zone.

FIGURE 3

Physiographic Zones of Northern Delaware



Mid-drainage: The majority of the study area falls in the Mid-drainage zone located between the Delaware Shore and Mid-Peninsular Drainage Divide zones. The modern tidal limit marks the center of the zone. The major drainages and their tributaries are fresh throughout the inland portion of the zone. Some tidal marshes and poorly-drained floodplains occur along the major drainages. Well-drained soils have developed on upper terraces of the drainages and on isolated headlands between the major drainages and their tributaries. Access to both brackish and freshwater resources makes this zone one of the richest in Delaware for hunters and gatherers.

Sea-Level Change: The location of the dividing line between the Delaware Shore and Mid-drainage zones has shifted during the Pleistocene. The most important factor in this landscape modification is post-glacial sea-level rise since about 14,000 years ago (Bloom 1983). Sea-level rise of over 100 meters has drowned the ancient course of the Delaware River across the continental shelf (Belknap and Kraft 1977; Fletcher 1988; Kraft et al. 1976). Low elevation land surfaces have become submerged and the configuration of the Delaware River and Bay have changed dramatically (Knebel, Fletcher and Kraft 1988). The rate of sea-level rise has decreased during the past 4,000 years slowing the rate of shoreline migration and the intrusion of tidal and salt waters up inland streams. Thus, the environmental zones discussed above have remained relatively constant for the last half of the Holocene. Most important is that the proposed right-of-way lies in an area of overlapping zones which increases its value to prehistoric peoples as a resource procurement area.

Drainages: The C&D Canal section of the relief route is defined by two easterly flowing streams. The southern boundary of the section is Scott Run which drains northeast into the C&D Canal. The northern boundary is Pigeon Creek, a branch of Red Lion Creek, that drains into Delaware Bay. The right-of-way also crosses Dragon Run Creek. Doll Creek Run, a small, northeast-trending tributary of Red Lion Creek, flows roughly parallel and west of existing Route 13. The right-of-way crosses several small, unnamed tributaries of these streams, as well as several ephemeral drainages. Swampy and poorly-drained areas are found adjacent to the major streams.

Soils: Soils in the project area fall within the Matapeake-Sassafras association (Matthews and Lavoie 1970). South of the C&D Canal Matapeake silt loams dominate, while to the north Sassafras sandy loams and Matapeake silt loams are evenly dispersed. Most of these soils are well drained, but badly eroded due to agricultural practices. Along the streams poorly-drained soils are more common.

Modern Setting

Land use in the project area has been primarily agricultural since Europeans colonization of the region. The majority of the project area south of the intersection of Routes 7 and 13 is still under cultivation. An exception is the town of St. Georges. The area north of the Routes 7 and 13 intersection and also the area west of Route 13 is largely residential and commercial. Approximately one mile to the east of the project area on its northern end lies the sprawling Texaco USA refinery, which has substantially altered the history, topography, and ambience of this section of the county. The project area itself has not been as significantly altered by increased development as have adjacent areas to the north and other portions of the State Route 1 Corridor to the south.

REGIONAL PREHISTORY

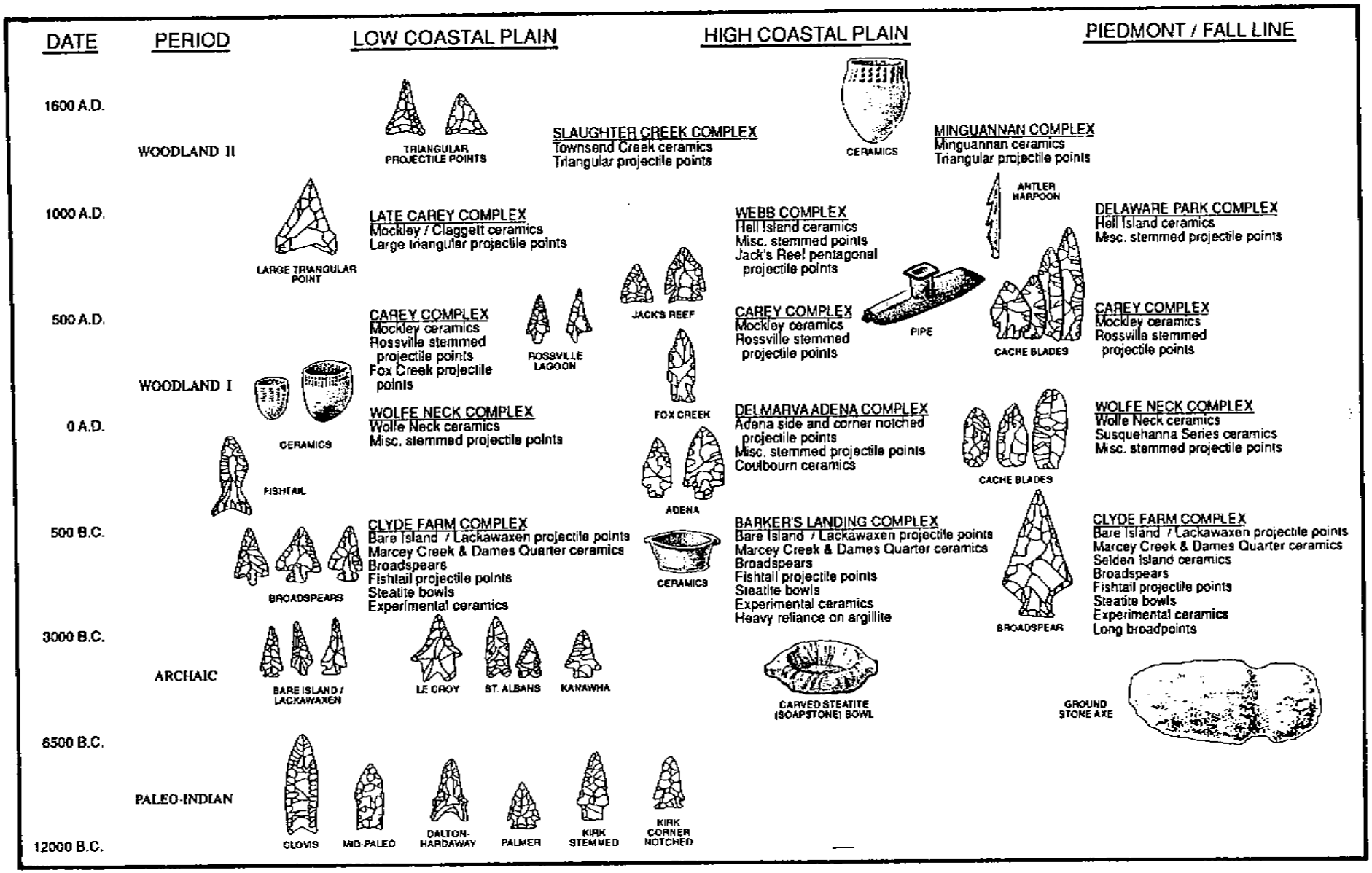
The prehistory of the region has been summarized by Custer (1984, 1989), Custer and Bachman (1986), and Bachman, Grettler, and Custer (1988); the following discussion is drawn from those sources. The prehistory of the Delaware Coastal Plain has been divided into four major blocks of time (Table 1): The Paleo-Indian Period, the Archaic Period, the Woodland I Period, and the Woodland II Period. The Contact Period begins with European colonization of the region and includes the period of transition in which Native Americans maintained their traditional cultures while adapting to the new social and economic conditions.

Paleo-Indian Period

The Paleo-Indian Period begins after the withdrawal of the last Pleistocene ice sheet from Eastern North America and lasts into the subsequent period of rapidly changing early Holocene environments. Paleo-Indians relied on hunting and gathering apparently with the emphasis on hunting. Extinct animals such as Bison antiquis, mastodon, and mammoth may have been hunted, as well as more northerly animals such as moose and caribou. A mosaic of boreal, deciduous, and

TABLE 1

Prehistoric Time Divisions for Northern Delaware



grassland environments overlain on the soil and landscape of the region would have provided a wide variety of productive habitats for these game animals.

The Paleo-Indian tool kit was used for catching, killing, and processing game animals. High quality stone was preferred for tools and careful resharpening and maintenance of tools was common. A mobile, seasonal lifestyle in which groups focused on game-attractive environments has been hypothesized. Social organization probably consisted of single and multiple-family bands. Throughout the 5500 year span of this time period, the lifestyle adaptation remained relatively unchanged, although adjustments occurred as environments changed. Paleo-Indian sites in Delaware include quarries, quarry reduction stations, base camps, base camp maintenance stations, outlying hunting sites, and isolated point finds (Custer 1986); however, no Paleo-Indian sites have been recognized in the study corridor (Hodny, Bachman, and Custer 1989).

Archaic Period

Archaic Period people adapted to warm and dry early Holocene environments with deciduous forests and grasslands. Post-glacial warmth reached a maximum around 7000 B.C. as variations in the earth's orbit decreased axial tilt and brought the planet closer to the sun during summer — the opposite of today's situation (Imbrie and Imbrie 1979; Kutzbach 1987). On the other hand, seasonality increased — warm, dry summers alternated with colder winters. In general, conditions became drier during the Paleo-Indian Period, but the dryness culminated during the Archaic Period as surface-water levels fell (Webb, Newby, and Webb1993). Game animals became more scarce as the Pleistocene megafauna became extinct and the ranges of northern species shifted north. However, browsing species such as deer probably flourished. Adaptations changed from the hunting focus of the Paleo-Indian Period to a generalized foraging pattern in which plant food resources played a more important role. Small procurement sites are known from favorable hunting and gathering locals such as near bay/basin features on Delaware's Coastal Plain. Persistent water sources supported some large base camps.

Tool kits were more generalized than earlier Paleo-Indian tool kits and showed a wider array of plant processing tools such as grinding stones, mortars, and pestles. A mobile lifestyle was probably common with a wide range of resources and settings utilized on a seasonal basis. A shifting band level organization which saw the waxing and waning of group size in relation to resource availability is evident. Custer (1989) has identified three types of sites for this period of Delaware prehistory: macro-band base camp, micro-band base camp, and procurement site. The most common settings for the macro-band base camps are large interior swamps and terraces along major rivers. Micro-band base camps and procurement sites occur on terraces along lower order streams and in proximity to hunting areas and lithic outcrops. There are no recorded sites from the Archaic Period in the project area.

Woodland I Period

The Woodland I Period begins as dramatic changes in local climates and environments occur throughout the Middle Atlantic region. Solar warmth and seasonal extremes eased somewhat and surface water levels rose (Webb, Newby, and Webb 1993). A reduction in the rate of continuing sea-level rise caused the expansion of biologically productive brackish and salt water marshes along the Delaware River and Bay shore. The major changes in environment and resource distributions caused a radical shift in adaptations for prehistoric groups. Important areas for settlements include the major river floodplains and estuarine swamp areas. Large base camps such as the Barker's Landing, Coverdale, Hell Island, and Robbins Farm sites have been found in many settings on the Delaware Coastal Plain. There was apparently a population increase and year-round occupation of sites. The overall tendency during the Woodland I Period was toward a more sedentary lifestyle.

Woodland I tool kits show minor variations, but also major additions compared with Archaic tool kits. Plant processing tools became more common suggesting intensive harvesting of wild plant foods. Chipped stone tool assemblages changed little from the preceding Archaic Period except for the introduction of broad-bladed, knife-like tools. First soapstone and then ceramic vessels were added also. These items enabled more efficient cooking of plant foods and may also have functioned as storage containers for surplus food. Storage pits and house features are also known from northern Delaware from sites such as Clyde Farm (Custer 1982) and Delaware Park (Thomas 1981). Occupation during the Woodland I Period was focused on the Mid-drainage zone. Most of the prehistoric archaeological sites in the project area date to the Woodland I Period (Hodny, Bachman, and Custer 1989:84).

Social organizations became more complex during the Woodland I Period. Increased food supplies with occasional surpluses and relatively sedentary lifestyles fostered the development of incipient ranked societies. The presence of extensive trade and exchange networks for lithic materials, caching of special artifact forms, and use of exotic raw materials are evidence of the increasing social complexity and interaction. The cemeteries of the Delmarva Adena Complex, such as the Frederica site and the St. Jones site (Thomas 1976), show that some individuals had special status in society.

Four cultural complexes (Table 1) have been identified for the Woodland I Period on the Upper Coastal Plain of northern Delaware (Custer 1984). Clyde Farm Complex macro-band base camps are large sites located in major riverine floodplains, along developing estuarine marshes, and in poorly-drained areas of the Piedmont. Micro-band base camps occur in outlying areas adjacent to specialized resource locations and procurement sites are a short distance from these campsites (Custer 1986:85). Two Clyde Farm Complex micro-band base camps are near the project area: site 7NC-E-11 is to the east along the north bank of Red Lion Creek and the other, site

7NC-E-2 (Indian Mound site) is west of the project area near the village of Red Lion. A Clyde Farm procurement site, 7NC-G-1, is west of the project area south of the C&D Canal. Two other Woodland I procurement sites, 7NC-G-19 and 7NC-G-30, which have not been associated with any cultural complex, are located east of the project area along the south bank of the C&D Canal (former channel of St. Georges Creek).

During Wolfe Neck times, there is a decrease in the use of rhyolite and argillite for stone tool manufacture, suggesting a decrease in the importance of these materials. The implication is that old trade networks and the concomitant exchange of information are reduced during this period. A Wolfe Neck macro-band base camp site may shed some light upon this problem. Otherwise, Wolfe Neck habitation and procurement sites and settlement locations appear to be similar to those of the preceding Clyde Farm Complex. No Wolfe Neck Complex sites appear in or adjacent to the project area, although there are some poorly known Woodland I sites in nearby drainages which could contain Wolfe Neck components

The Carey Complex component in northern Delaware has been best expressed at the Clyde Farm site (7NC-E-6) and at the Delaware Park site (7NC-E-41). These large macro-band base camps contain storage features (indicating a reliance upon the harvesting of plant foods) and house pits. The Carey Complex is distributed throughout Delaware. A heavy dependence upon fish and shellfish is observed by Custer (1984:131). Carey Complex sites in the project area would most likely take the form of micro-band base camps and procurement sites associated with the larger base camps noted above. The Delaware Park Complex is characterized by a similar settlement pattern and adaptation and once again only micro-band base camp and procurement sites would be expected within the proposed right-of-way. There are no Carey or Delaware Park Complex sites known within or adjacent to the proposed right-of-way.

Woodland II Period

In many areas of the Middle Atlantic, the Woodland II Period is marked by the appearance of agricultural systems; however, on the Delaware Coastal Plain there is no evidence of agriculture. Some of the settlements of the Woodland I Period, especially the large base camps, were also occupied during the Woodland II Period and very few changes in basic lifestyles and overall artifact assemblages are evident. Intensive use of plants and hunting remained the major subsistence activities until European contact. There is some evidence, nonetheless, of an increasing reliance on plant foods and coastal resources throughout the Woodland II Period in the study area. Social organization changes are evidenced by a collapse of the trade and exchange networks and the end of the appearance of elaborate cemeteries.

Custer (1986) notes that the data quality for the Woodland II Period for the study area is poor. Only two sites from the period occur near the project area: 7NC-E-12 (site function unknown) and 7NC-G-30, a procurement site. Any macro-band base camp in the area would likely

show a prehistoric use of several environmental zones and micro-band base camps would suggest local resource exploitation.

Contact Period

The Contact Period is an enigmatic period of the archaeological record of Delaware which begins with the arrival of the first substantial numbers of Europeans in Delaware. No Native American archaeological sites that unequivocally date to this period have been discovered in Delaware. A number of sites from the Contact Period are known in surrounding areas such as southeastern Pennsylvania, nonetheless. It appears that Native American groups of Delaware did not interact much with Europeans and were under the domination of the Susquehannock Indians of southern Lancaster County, Pennsylvania. Thus, the discovery of any Contact Period sites would be significant. The Contact Period ends with the virtual extinction of Native American lifeways in the Middle Atlantic area except for a few remnant groups.

REGIONAL HISTORY

This overview is abstracted from Custer and Bachman (1986), De Cunzo and Catts (1990), Munroe (1978), Hancock (1932), Hoffecker (1973, 1977), Lemon (1972), Scharf (1888), and Weslager (1961, 1967). A more detailed historical overview of the general State Route 1 Corridor is provided in the Phase I/II Research Plan (Custer, Bachman, and Grettler 1987). The Historical period is divided into five parts (Table 2) following the scheme of De Cunzo and Catts (1990).

Exploration and Frontier Settlement

In 1638 a Swedish colony was established at the confluence of the Brandywine and Christina Rivers in what is now Wilmington. The small colony grew and within a few years a fort, church, and small farming community grew to form the nucleus of the first permanent European settlement in Delaware. The Swedish colony interfered with Dutch colonial interests and in 1651 the Dutch established Fort Casimir near modern New Castle. The Dutch resolved the conflict through military action and founded the town of New Amstel near Fort Casimir. English influence in the Delaware valley region began in 1664 when Sir Robert Carr seized the Dutch colonies and assumed possession for James, Duke of York and Albany. The transfer of authority from the Dutch to the British was peaceful in Delaware. Existing land ownership, trading privileges, and political structure were maintained by the new leadership. The Swedish, Finnish, and Dutch colonists remained and new immigrants, including English and Scotch-Irish, supplemented the growing population forming an ethnically mixed community.

In 1682, William Penn was granted proprietary rights over Pennsylvania and the Lower Three Counties — modern Delaware. Political frictions soon developed between the Quakers of Pennsylvania and the colonists of the Three Lower Counties, leading to a separate government and relative autonomy for the southern colonists. Economics linked Penn's divided colony, however,

TABLE 2

Historical Time Divisions for Delaware

Date Range (A.D.)	Historical and Research Contexts
1880 - 1940	Urbanization and Suburbanization
1830 - 1880	Industrialization and Capitalization
1770 - 1830	Transformation from Colony to State
1730 - 1770	Intensified and Durable Occupation
1630 - 1730	Exploration and Frontier Settlement

From De Cunzo and Catts (1990) Management Plan for Delaware's Historical Archaeological Resources

and the Penn family's claims to Delaware were finally relinquished just prior to the American Revolution.

The early Dutch and Swedish pattern of closely spaced villages along the Delaware River was gradually replaced by the English colonial settlement pattern of scattered farmsteads along internal drainages, such as Red Lion, St. Georges, and Dragon creeks in the study area, and along emerging roads. The pattern of scattered settlement was encouraged by economic factors. For example, Philadelphia required increasing numbers of marketable foodstuffs for local consumption and export and land speculators parceled huge tracts of productive farmland obtained from Penn. Philadelphia's economic influence during the eighteenth century caused a shift in agricultural activities in Delaware from subsistence to market crops.

Waterways were important for transportation and commerce because early roads were limited and in poor condition. The few existing roads led to landings on rivers and the Delaware Bay where produce and goods were shipped by cheaper, and more efficient, water transport. The Delaware River and Bay served as a major focus of water transportation because the majority of Delaware's streams flow eastward. For this reason, the large port city of Philadelphia, and to a lesser extent Wilmington and New Castle, exerted major commercial influence on the Delaware counties throughout the eighteenth century and later. Wilmington, New Castle, and Lewes were also ports for ocean-going vessels involved in export trade. Overland transport was limited to a few major roads, such as the eighteenth-century post road connecting Philadelphia, Wilmington,

New Castle, Odessa, Middletown, Dover and Lewes, with a western branch at Milford leading to Chesapeake Bay. Development was stimulated at crossroads like Wrangle Hill, in the project area, and Red Lion, about one-half mile west of the study area. The village of St. Georges was a transshipment point and a ferry crossing.

Intensification and Durable Occupation

By the middle of the eighteenth century, population increase and commercial expansion stimulated the growth of towns and the development of transportation and industry. During the 1730s, successful attempts were made to harness waterpower on the Brandywine and Christina rivers resulting in the growth of Wilmington as the foremost milling and shipping center in Delaware. The availability of wheat from the central Mid-Atlantic region, economical transportation, and the proximity of the Philadelphia and New York markets facilitated the commercial rise of Brandywine mills. During the later part of the eighteenth century, Wilmington's economy focused on shipbuilding, coopering, milling, and import-export trade.

The rise of commerce and industry in Wilmington had significant impacts on the rural areas of New Castle and Kent counties. The technologies used in the Brandywine Valley spread to these areas resulting in an extensive network of mills throughout the colony. The water-powered mills frequently served a variety of purposes with grist, saw and fulling (woolen cloth) operations during different seasons of the year. The mills produced goods primarily for local markets.

Transformation from Colony to State

The American Revolution dominated the social and political climate of the colony at the start of this time period. The British blockade disrupted maritime transportation and raiding parties landed and took food, livestock, and slaves from the locals. A British force including Hessian mercenaries landed in Cecil County, Maryland and marched east towards Philadelphia. A small group of continental soldiers and militia skirmished with the British forces near Cooch's Bridge (near Glasgow), but was forced to retreat. The British went on to capture Wilmington which traded hands throughout the winter of 1777-1778. Washington's army later passed through northern Delaware headed south towards Yorktown. Earlier, Lafayette's French troops had landed at Christiana and marched west towards tidewater Virginia.

After the war, population grew rapidly, but agricultural productivity began to drop. However, the early decades of the nineteenth century saw the beginning of an agricultural revolution throughout Delaware, but concentrated in New Castle County. The first agricultural society in the United States was formed in New Castle County in 1804 and emphasized scientific agriculture. Marl, a natural fertilizer, was discovered during the construction of the C&D Canal in the 1820s. The opening of the canal in 1829 encouraged farmers to grow fresh market crops because transportation became quick and cheap.

Industrialization and Capitalization

A transportation revolution was underway by the early 1830s. Steam power was being developed and investment into canals and railroads was the topic of much discussion and legislation (see Gray 1959 and Holmes 1961, for example). The C&D Canal, finished in 1829, carried 100,000 tons of cargo in 1837. Peak tonnage was in the year 1872, when 1,318,772 tons were transported (Snyder and Guss 1974). Delaware City, Delaware and Chesapeake City, Maryland, the terminus towns at either end of the canal, were not established until its construction. Locks were located at Chesapeake City, Maryland and at St. Georges, Delaware. The "King's Highway" crossed the canal at St. Georges. These points would have served various capacities during construction of the canal and after its completion, including: housing for construction workers, supply points for food and equipment needed for construction, housing for lock tenders and mule drivers, stabling for mules, transshipment points for marketable farm products, access points for passengers for coastal packets, the locations of marine supply stores for canal shipping, and support facilities for canal maintenance crews.

The opening of the Philadelphia, Wilmington and Baltimore Railroad in 1839 provided transportation for northern Delaware produce to growing eastern markets. Prior to 1832, Delaware's primary agricultural products were grains, with fruit and vegetable crops of lesser importance. During the period 1832-1870 Delaware became the center for peach production in the eastern United States. Rich soil, favorable climate and rainfall, excellent transportation facilities, and strategic locations near large markets made peach production a lucrative enterprise. Delaware City, at the eastern terminus of the C&D Canal, led Delaware and New Castle county in production until the peach blight of the 1850s. By the end of the "peach boom", massive harvests were being shipped by rail and steamship lines to New York where much was readied for resale to the northern states. The peach industry proved profitable for a large number of peach growers, as well as a variety of support industries. Basket factories, canneries, and peach tree nurseries all aided in and reaped the financial rewards of the peach industry. The railroad and steamship lines integral to peach distribution depended on peach shipment for a large portion of their annual revenue. The construction of Italianate style "peach houses" accompanied the influx of money which resulted from the growth of the peach industry and peach houses are common in the study area.

Throughout Delaware's agricultural history, farm labor has been a valued commodity. In the colonial period, black slaves and white indentured servants were the primary farm laborers. By the mid-eighteenth century, white indentured servants were as numerous as black slaves. Slightly less than one-half of the blacks in the state in 1790 were free; however, by 1810, less than one-quarter of blacks were slaves according to Federal censuses. Therefore, in the eighteenth century, free black laborers played an increasing role in farm production. Abolitionist attitudes

were strong in Delaware and legislation enacted by Quaker and Methodist leaders restricted the increase of slaveholding, especially in New Castle and Kent counties, by prohibiting the importation and exportation of slaves. A combination of economic and ethical factors led to an increase in the numbers of free blacks in Delaware before the Civil War and the Emancipation Proclamation.

Urbanization and Suburbanization

Through the nineteenth century, and into the twentieth century, Delaware's agricultural production continued to focus on the perishable products with a decrease in staple crops. There was a marked increase in milk and poultry production while the levels of fruit and vegetable production were maintained. In northern Delaware, improved roads and the continued growth of Wilmington as an industrial center led to urban growth. Eventually, the suburbs expanded onto farm land. Both farm sizes and the amount of farm acreage dropped after the beginning of the twentieth century suggesting a period of farm abandonment (De Cunzo and Catts 1990). Many nineteenth-century farms became archaeological sites during this reorganization of settlement on the landscape.

The pattern and density of settlement in Delaware, and the study area specifically, have been strongly influenced by several factors throughout the last 360 years: 1) an agrarian economy; 2) the commodity demands of large markets, first Europe and the West Indies, and later domestic commercial-industrial centers; and 3) transportation facilities. The advent of automobile transportation in the twentieth century brought about significant improvements in the state road system and opened large tracts of land to productive agriculture. The DuPont Highway constructed in the 1920s linked the northern and southern sections of the state and shifted the agrarian focus of the southern counties permanently toward non-local markets.

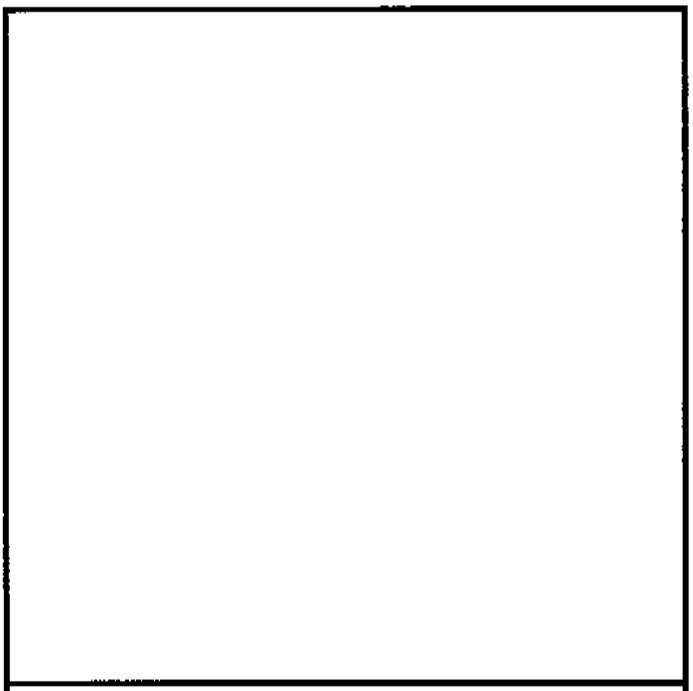
METHODS

Phase II testing entails excavations to determine the horizontal extent, depth, integrity, and significance of archaeological deposits identified during Phase 1 surveys. In the field, a reference grid is established over the area and test units are marked. In some cases, testing involves excavation using shovel test pits (STPs) to establish the depths of deposits or the presence and density of cultural material in an area. Soil and sediment removed from the units and shovel test pits in measured levels are screened through 1/4-inch hardware cloth (Plate 1). Material recovered from each level is bagged and sent to the lab for cataloging, cleaning, and analysis. Written records are kept of all excavations, activities, and findings.

Excavation methods vary from site to site depending on the nature of the site, its setting, and the deposits encountered. In plowed fields a controlled surface collection may be undertaken before excavation begins. All material visible on the ground is collected within grid squares laid

PLATE 1

Screening Soil at the Dragon Run North B Site (7NC-G-104)



William Stack sifts through the soil excavated from a test square and searches for artifacts. The use of screens insures that all material larger than a quarter of an inch will be recovered.

out on the ground. The size of excavation units may also vary. For prehistoric sites the standard unit is a one by one meter square. For historical sites three or five foot squares are excavated. On historical sites the squares can often be placed in relation to known structures on the site, but on prehistoric sites there is seldom any surface expression of the underlying material or features.

In most cases a plow zone is encountered and treated as one level. Any material below the plow zone, barring any other disturbance, is in primary context where it was deposited by the occupants of the site. Features may also be exposed below the plow zone. Features are excavated independently of surrounding material. Where conditions are favorable, special samples for flotation, radiocarbon, or soil chemical analysis are taken. Cultural features found below the plow zone, or in other undisturbed contexts, are the best evidence of site integrity and possible significance.

RESULTS OF PHASE II TESTING

Nine sites, eight prehistoric and one historical (Table 3), were recommended for testing after the Phase I survey of this segment of the State Route 1 Corridor (Hodny, Bachman, and Custer 1989). The testing results are grouped into three sets:

1)four prehistoric sites that produced little further material or information during the Phase II testing (Small, Low-Density Sites);

2)two prehistoric sites that produced substantial amounts of cultural material, but were not considered eligible for nomination to the National Register of Historic Places (Larger, Higher-Density Sites); and

3) two prehistoric sites and one historical site with substantial and intact deposits of cultural material which made them eligible for nomination to the National Register of Historic Places (Significant Sites).

TABLE 3

Archaeological Sites Subject to Phase II Testing

Site Number	C.R.S. Number	Site Name
Small, low-density sites		
7NC-E-93	N-12119	Conrail South A Prehistoric site
7NC-E-92	N-12118	Conrail South B Prehistoric site
7NC-G-103	N-12125	Dragon Run North A Prehistoric site
7NC-G-102	N-12124	Weaver Prehistoric site
Larger, higher-density sites		
7NC-G-100	N-12116	Parkway Gravel Prehistoric site
7NC-G-104	N-12126	Dragon Run North B Prehistoric site
Significant Sites		
7NC-G-105	N-12127	Wrangle Hill South Prehistoric site
7NC-G-101	N-12117	Snapp Prehistoric site
7NC-E-98	N-5053	Woodville Farm Historical site

See Figure 2 for the site locations. Sites are listed in the order in which they are discussed. Note that the Woodville Farm site was referred to as the Smith Historical site in the Phase I Survey report (Hodny, Bachman, and Custer 1989).

The Phase II research at each site is described individually below, followed by a discussion and interpretation of the results as a whole, and finally by recommendations for further research.

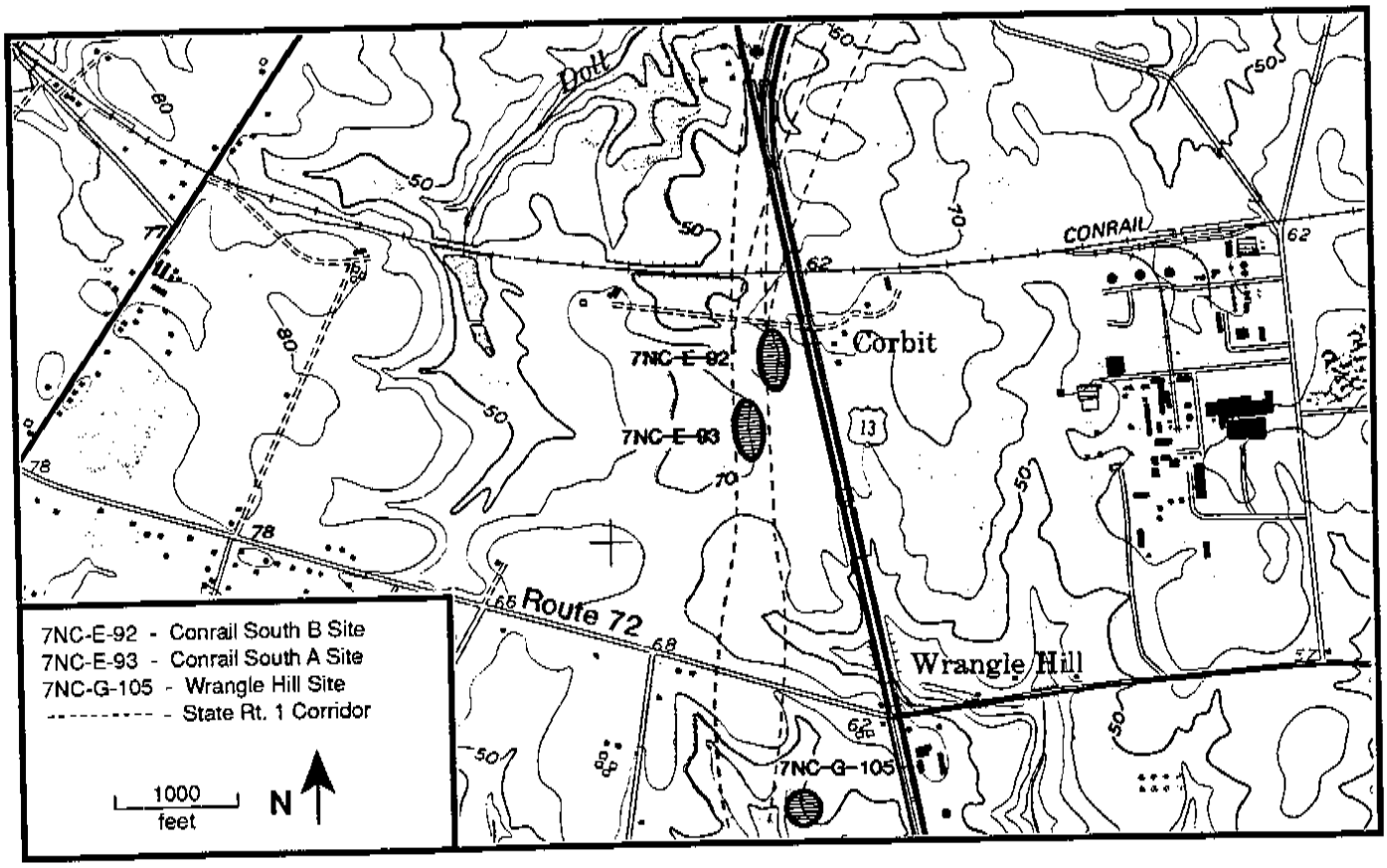
SMALL, LOW-DENSITY SITES

Conrail South Prehistoric Sites

A pedestrian survey of the proposed highway right-of-way immediately south of the Conrail tracks found two concentrations of prehistoric artifacts which were designated as the Conrail South A (7NC-E-93) and Conrail South B (7NC-E-92) sites (Figure 4). Site 7NC-E-93 is a low-density scatter of artifacts located on a low knoll bounded by a series of ephemeral drainages (Figure 5). The Phase I surface collection from the site recovered three Woodland I type points of quartzite and jasper (Plate 2), waste flakes of quartzite and jasper, and fire-cracked rock (FCR) (Hodny, Bachman, and Custer 1989:63,99).

FIGURE 4

Location and Setting of the Conrail South Sites A (7NC-E-93) and B (7NC-E-92)



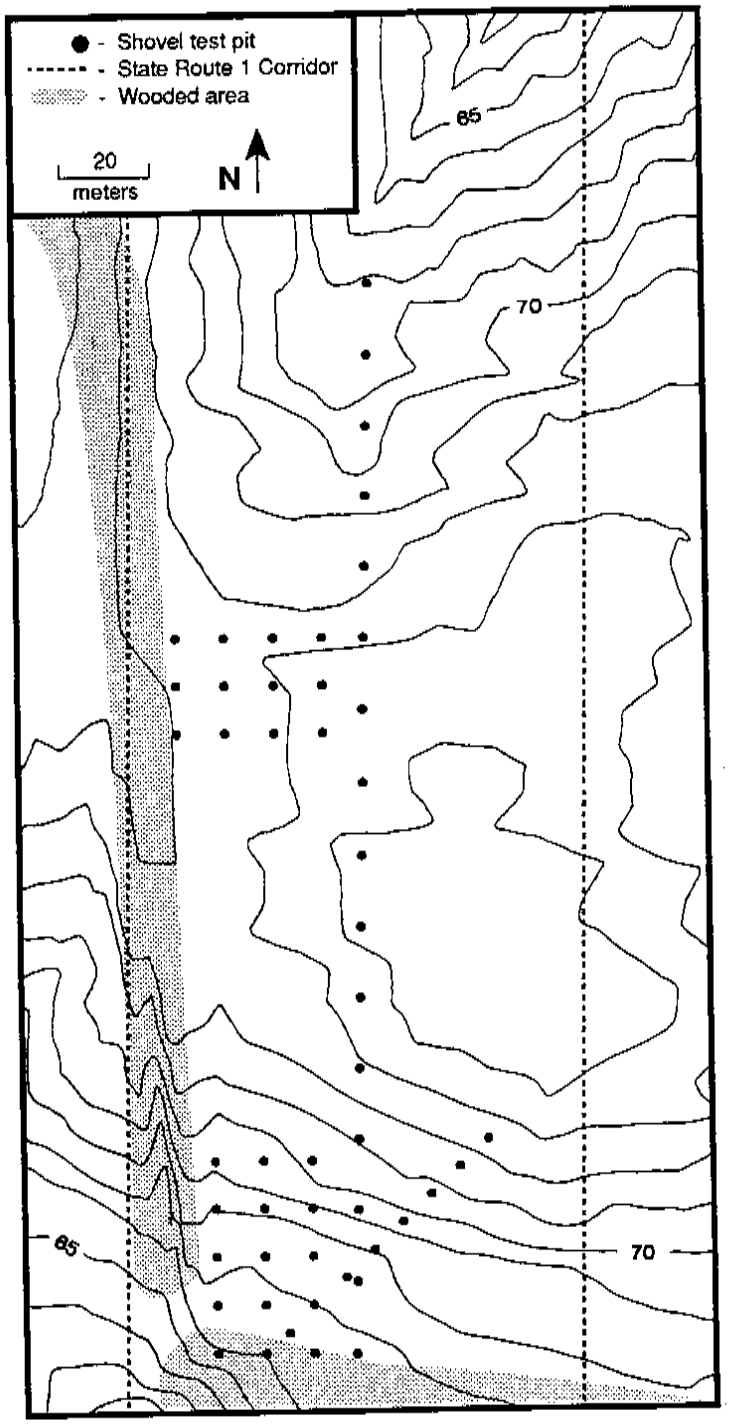
The Conrail South B Prehistoric site, 7NC-E-92, lies on the northeast slope of a low knoll surrounded by ephemeral drainages within the highway right-of-way just north of site 7NC-E-93 (Figure 6). Artifacts collected during Phase I survey of the plowed field consist of one chert flake, one quartz core, and six fragments of fire-cracked rock (Hodny, Bachman, and Custer 1989:63,100).

Conrail South A: Sixteen 1x1 m square units were placed along a line running north-south across the knoll identified as the location of site 7NC-E-93. Units were placed at 15 meter intervals (Figure 5). No prehistoric cultural material was recovered in any of the 1x1 m units. The depth of the plow zone varied systematically across the knoll. In the area of the ephemeral drainages the plow zone ranged up to 25 cm in depth, but on the knoll was only 10 cm thick indicating significant soil erosion on the site. Excavations extended 10-20 cm below the plow zone in all sixteen units. Two soil discolorations were found below the plow zone, but further investigation determined that they were noncultural and contained no artifacts.

Two grids of shovel test pits were excavated where artifact density was greatest in the Phase I survey. To the south, 15 shovel test pits spaced 10 meters apart found two possible features. The shovel test pits containing the features were converted into 1x1 m units. The features appeared to

FIGURE 5

Conrail South A Site (7NC-E-93) Phase II Testing



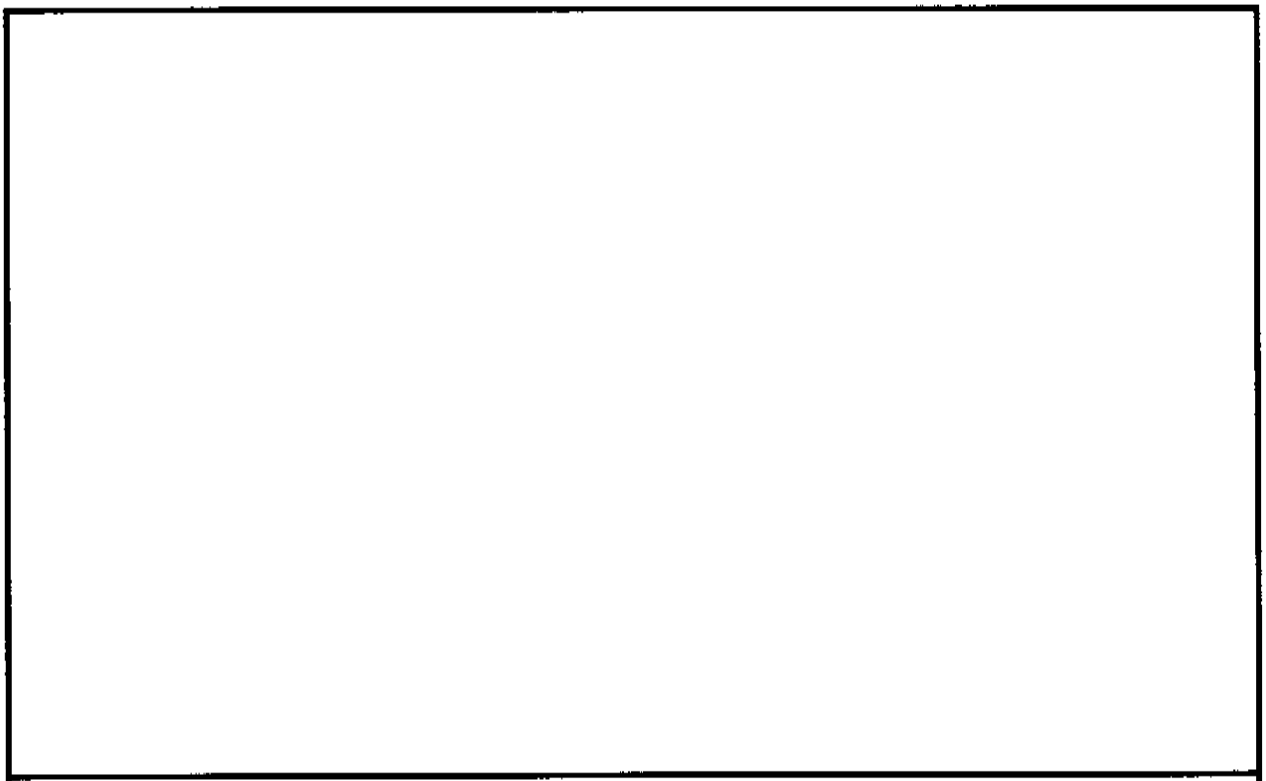
be part of a ditch buried by slope wash from the knoll. Another line of 7 shovel test pits excavated at an angle to the grid confirmed the presence of a historical ditch. The second array of 12 shovel test pits was excavated to the north, again with negative results.

The total collection of prehistoric artifacts from the site resulted from the Phase I surface collection of the plowed field (see Hodny, Bachman, and Custer 1989:99). No cultural material was recovered in the Phase II excavations. The excavations revealed that agricultural activities have substantially modified the original topography of the area. Topographic highs have been eroded and lower areas filled in. The prehistoric occupation of the site occurred during the Woodland I Period based on artifact typology (see Plate 2), and the site probably resulted from short-term occupation during a hunting and/or gathering foray.

Conrail South B: Site 7NC-E-92 was tested by excavating a grid of shovel test pits across the site area within the highway right-of-way (Figure 6). Twenty-one shovel test pits had been excavated adjacent to the Conrail tracks during the Phase I Survey in search of a historical structure mentioned in documents (Hodny, Bachman, and Custer 1989:64). No

PLATE 2

Prehistoric Artifacts from the Conrail South A Site (7NC-E-93)



A: Mid-section of a white, quartzite stemmed biface. B: White quartz, Woodland II triangle. C: Tan and light gray jasper, side-notched projectile point; the right corner is broken--probably a Woodland I age fishtail type.

cultural material, historical or prehistoric, was found in those excavations. The Phase II excavations on the Conrail South B Prehistoric site were placed across an ephemeral drainage and included two topographic high points. No prehistoric artifacts were recovered in the 74 shovel test pits excavated. Plow zone depths varied as on the Conrail South A site (7NC-E-93) to the south. No features were encountered.

A short-term, limited-activity use of the locality left only a meager archaeological record. It may be that the small knolls were suitable camping spots for short trips away from a larger campsite where the majority of cultural activities took place. The lack of subsurface features and low density of artifacts at both sites suggest only cooking and tool resharpening.

Dragon Run North A Prehistoric Site

Site 7NC-G-103 was identified in a pedestrian survey of plowed fields within the highway right-of-way (Hodny, Bachman, and Custer 1989:58). The site is located on a pronounced knoll and extends west and around the head of an ephemeral drainage that is an unnamed tributary of Dragon Creek (Figure 7). Prehistoric artifacts that identified the site's presence consisted of fire-cracked

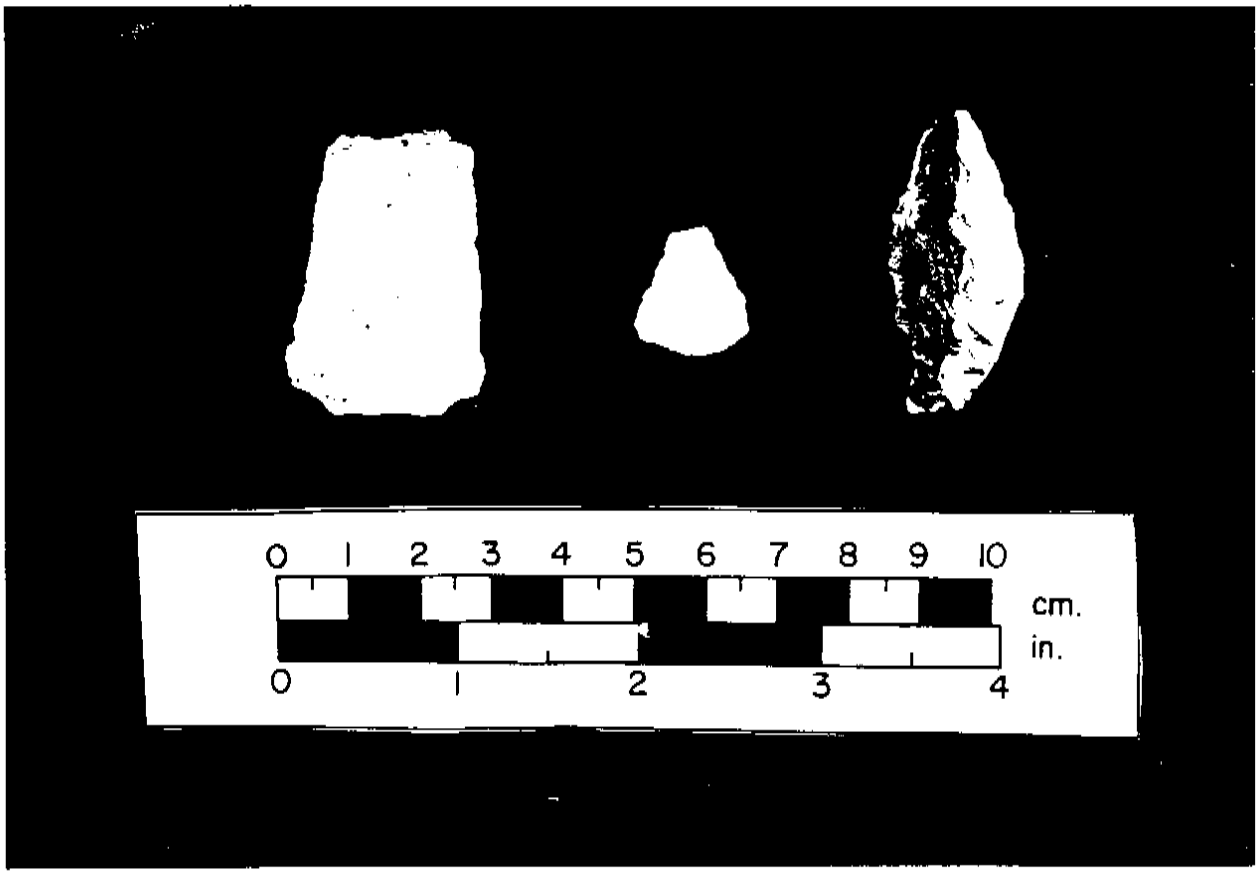

0 1 2 3 4 5 6 7 8 9 10
cm.
in.
0 1 2 3 4

FIGURE 6

Conrail South B Site (7NC-E-92) Phase IITesting

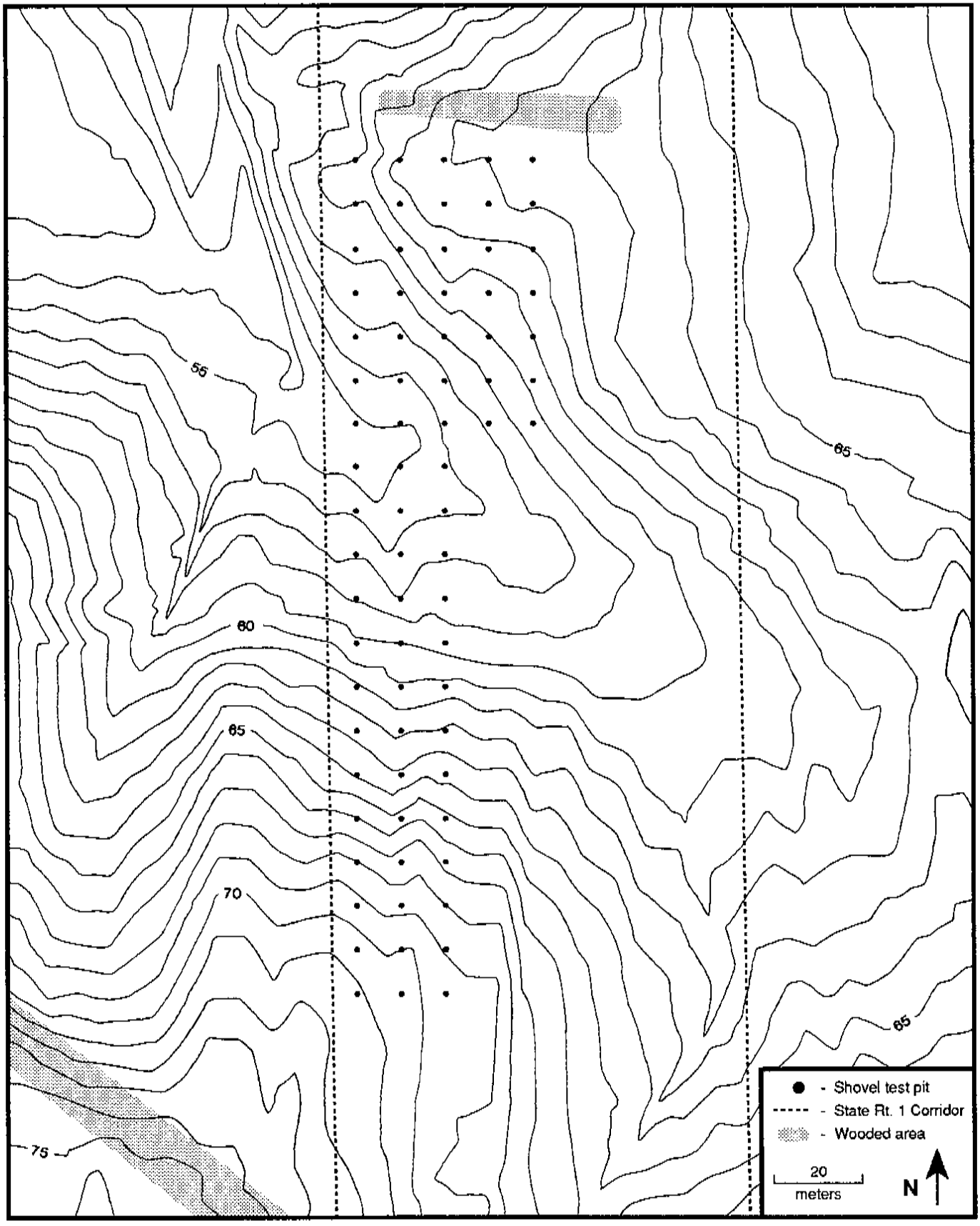
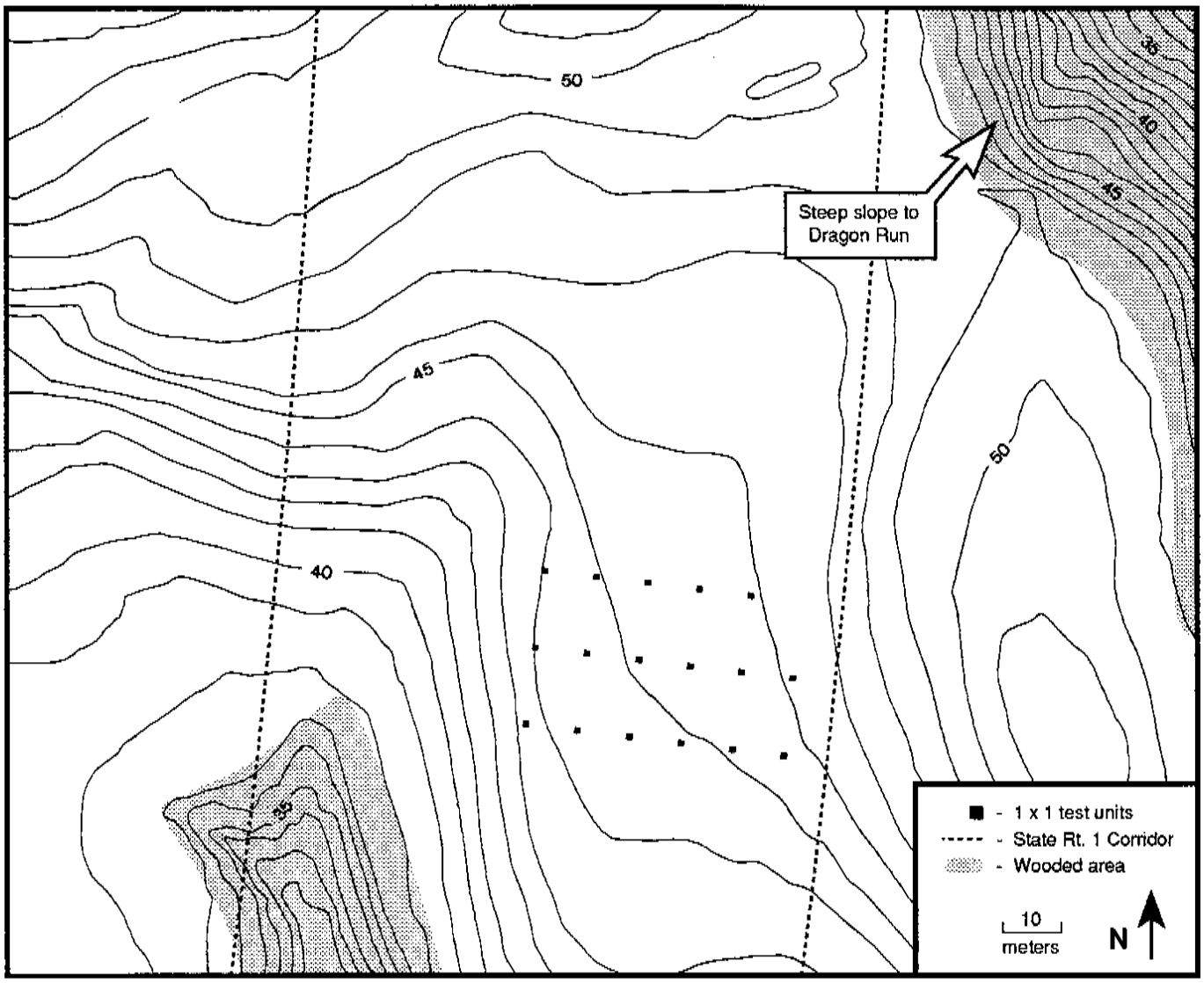


FIGURE 7

Dragon Run North A Site (7NC-G-103) Phase II Testing



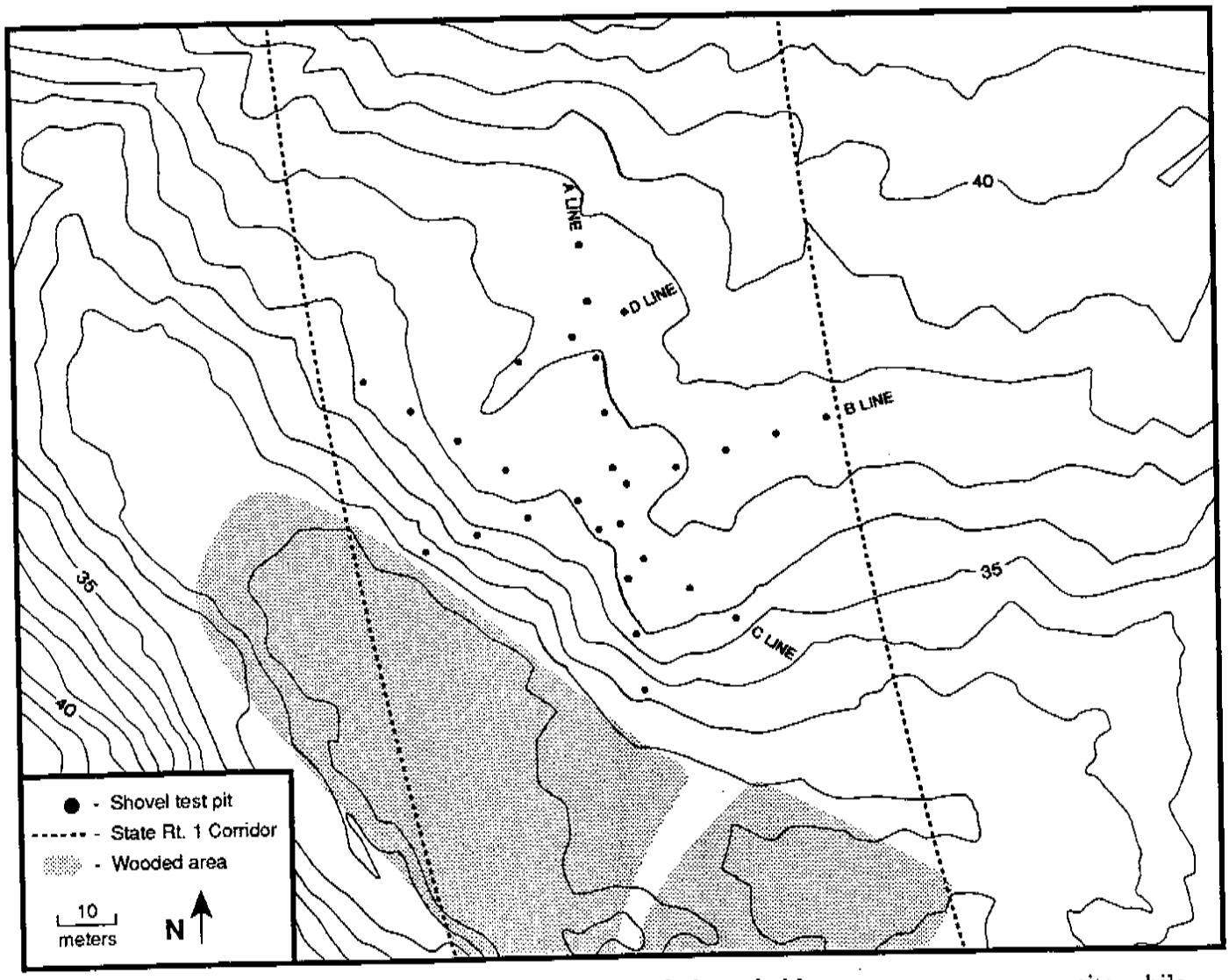
rock, quartz flakes, quartz cores, and an anvil or nutting stone. Most of the artifacts were within a 50x100 ft area on the crest of a knoll.

A 10 meter grid of 1x1 m units was placed within the highway right-of-way adjacent to the crest of the knoll during Phase II investigations of the site (Figure 7). The area slopes to the west away from the knoll and the tributary of Dragon Run. Prehistoric artifacts were recovered from the plow zone in five of the 17 units excavated. Six flakes, two utilized flakes, two fragments of fire-cracked rock and one biface were recovered. The biface is a stemmed, Woodland I type made from a chert flake.

Based on the artifacts collected in the Phase I survey and those few added during the Phase II (see Appendix I), it is difficult to draw any conclusions about the occupation of this site. People

FIGURE 8

Weaver Site (7NC-G-102) Phase IITesting



used the locality during the Woodland I time period, probably as a temporary campsite while hunting and gathering.

Apparently the highway will not impact the main part of this site located on the crest of the knoll. Excavations show that no intact cultural remains exist in the highway right-of-way. The artifacts recovered from the plow zone may have eroded down slope from the knoll.

Weaver Prehistoric Site

A walking survey of a cultivated field identified the Weaver Prehistoric site, 7NC-G-102 (Hodny, Bachman, and Custer 1989:53). Four utilized quartz flakes, one quartz biface fragment, one chert core, and one quartz tool, possibly a broken drill, were collected. Fire-cracked rock was also observed. The site is located 350 feet south of County Road 409 above a small, unnamed stream draining south into the St. Georges River (C&D Canal). A long broad slope leads to a low knoll northeast of the site (Figure 8).

Phase II investigations of the site entailed excavation of 29 shovel test pits in three transects crisscrossing the site (Figure 8). Only one quartz flake was recovered. Again a short-term, limited-activity occupation disturbed by plowing is indicated. The occupation probably occurred during the Woodland Period.

Discussion

The four small sites discussed above yielded very few artifacts or other cultural information. However, such sites are very common in the region (Custer 1989:200,216,324-325); therefore, they represent a significant portion of the archaeological record. Perhaps the best information they supply is locational as they show how prehistoric cultures used the landscape. This issue will be considered in more depth later.

Several methods were used to investigate the sites — surface collections, shovel test pits, and 1x1 m excavation units. For these four small sites located in plowed fields, surface collections yielded the majority of the information. Excavations revealed the lack of intact stratigraphy on the sites and showed how sediments had been redistributed by plowing and soil erosion, but failed to recover additional artifacts for analysis. The core areas of the sites were intensively tested and yielded similar results. The ephemeral nature of these sites mirrors the ephemeral nature of the drainages and landform features with which they are associated.

Excavation of shovel test pits yielded the same information as the more extensive, time consuming excavation of 1x1 m units. Although 1x1 m units sample a greater volume of sediments and expose a clear view of the plow zone/subsoil interface, the returns do not appear to justify the added effort and expense of their excavation. Surface collection alone cannot be relied upon to assess this type of archaeological site, however.

In wooded areas where the ground surface is not exposed, as in plowed fields, shovel test pits and/or 1x1 m unit excavations might not be effective at locating low-artifact density sites. Land-use patterns for this type of site are probably skewed towards areas now under cultivation. The potential bias may not be serious because of the extent of cultivation in the region.

LARGER, HIGHER-DENSITY SITES

Parkway Gravel Prehistoric Site

Site 7NC-G-100 is on the edge of a knoll on the north side of Scott Run between an ephemeral drainage and existing Route 13 (Figure 9). In fact, Route 13 was cut through the knoll on which the site is located. Artifacts recovered in a pedestrian survey were a quartz core, two chert cores, a utilized chert flake, a straight-stemmed, chert projectile point fragment, and a gunflint (Hodny, Bachman, and Custer 1989:42-45). More than 50 fire-cracked rock fragments were observed on the site. Three shovel test pits excavated in the wooded area adjacent to the floodplain

FIGURE 9

Parkway Gravel Site (7NC-G-100) Phase II Testing

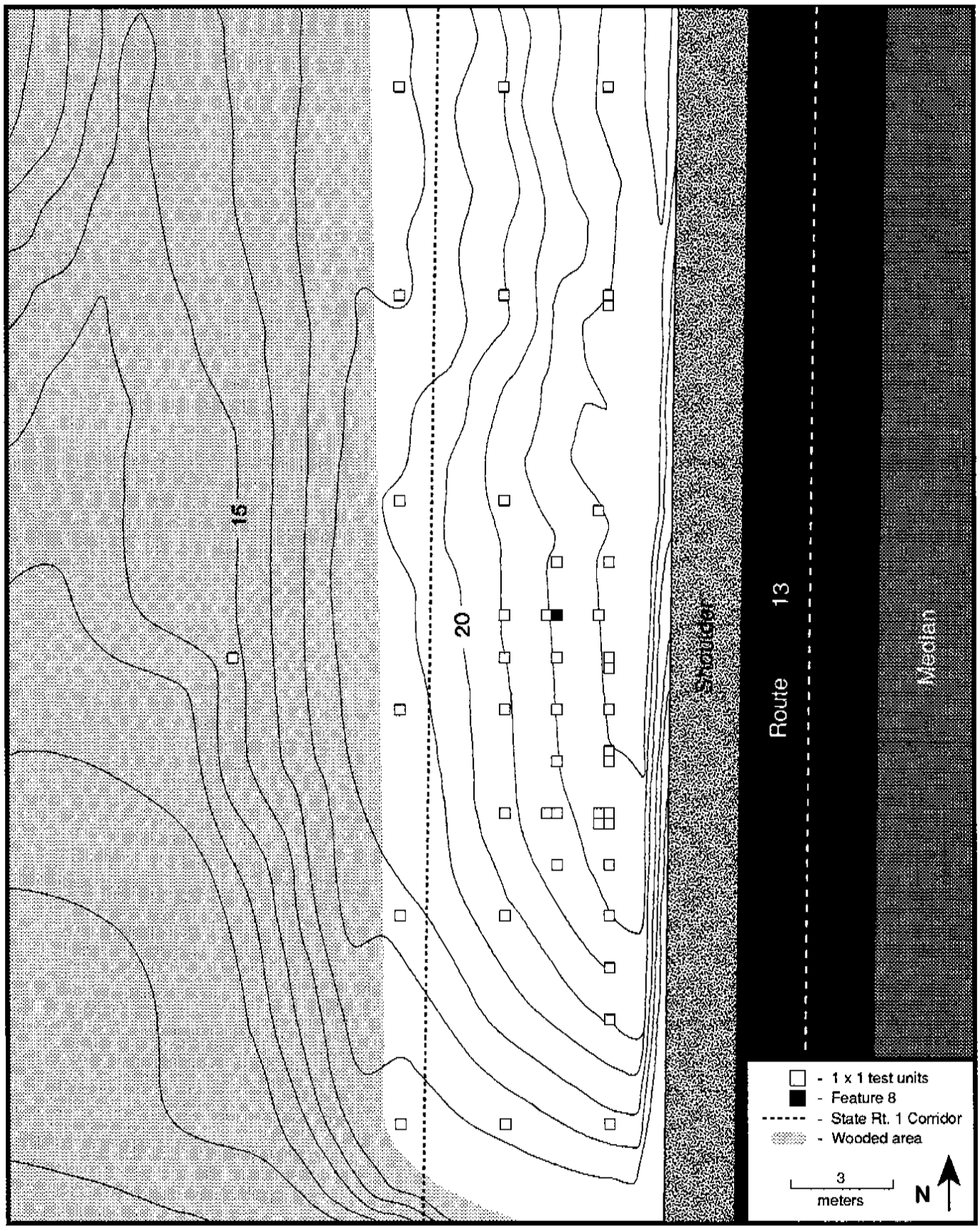
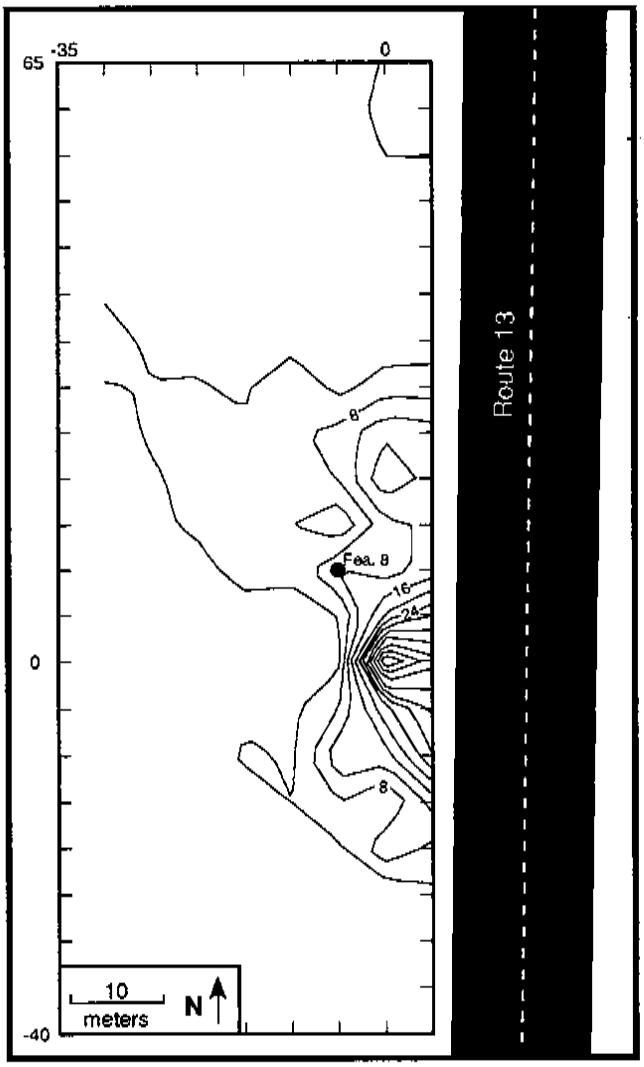


FIGURE 10

Parkway Gravel Site

(7NC-G-100) Flake Distribution



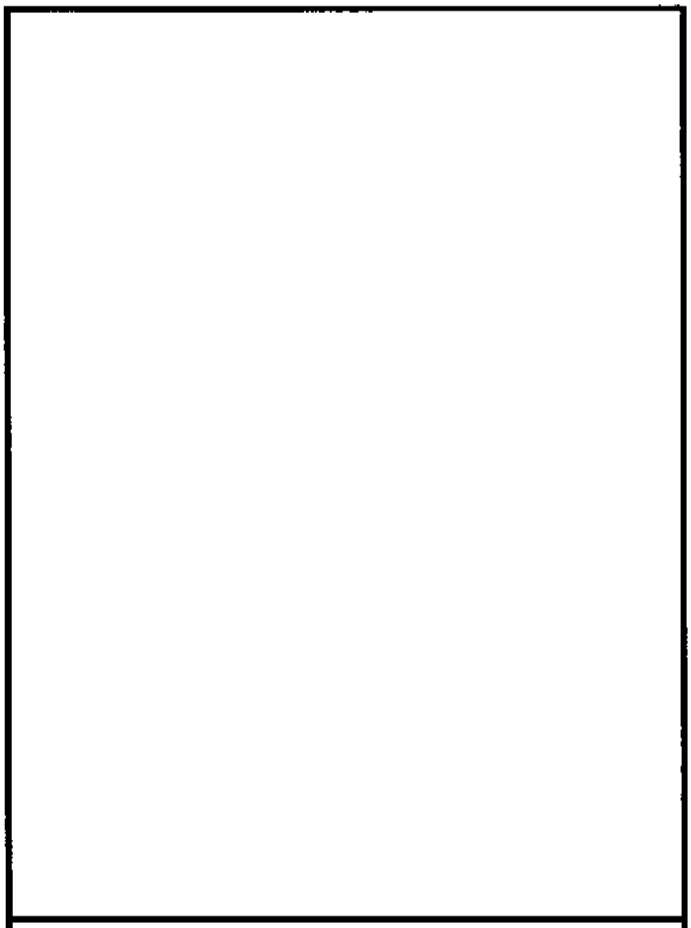
of the ephemeral drainage recovered one jasper flake. The wooded area was thought to be unplowed, and thus had the potential for undisturbed archaeological deposits.

Forty-five 1x1 m units were excavated during the Phase II testing of the site. A substantial amount of material was recovered including 331 flakes (Figure 10), 357 fire-cracked rock fragments, 8 cores, 12 biface rejects, 11 flake tools, and 19 utilized flakes (Table 4 and Appendix I). In addition three stemmed, Woodland I type, projectile point bases, and one other biface fragment were found (Plate 3). The majority of this material was found in the plow zone. One unit was placed in the wooded section of the site, but only one quartz flake and one fragment of fire-cracked rock were recovered.

The soils and sediments on the site changed from the top of the knoll down to the stream (Figure 11). On top of the knoll the plow zone sediments were loams and sandy loams without appreciable gravel even at depth. Down slope gravels became more prevalent and larger in a sandy matrix, until the toe of the slope was reached in the wooded area. In the woods, sediments were silty clays with some sand and gravel. A buried plow zone was encountered in Unit N5W36 excavated in the woods. The wooded terrace extended another 5 meters to the west of unit N5W36 where a short scarp (0.3-0.6 m high) gave way to another 6 meter wide terrace next to the stream. The slopes of the knoll are severely eroded. Sediments have accumulated in the woods where historical cultural material was recovered up to 50 cm deep. The woods had been plowed in the past, probably all the way to the creek, which has since incised a channel and established a narrow flood plain.

PLATE 3

Prehistoric Artifacts from the Parkway Gravel Site (7NC-G-100)

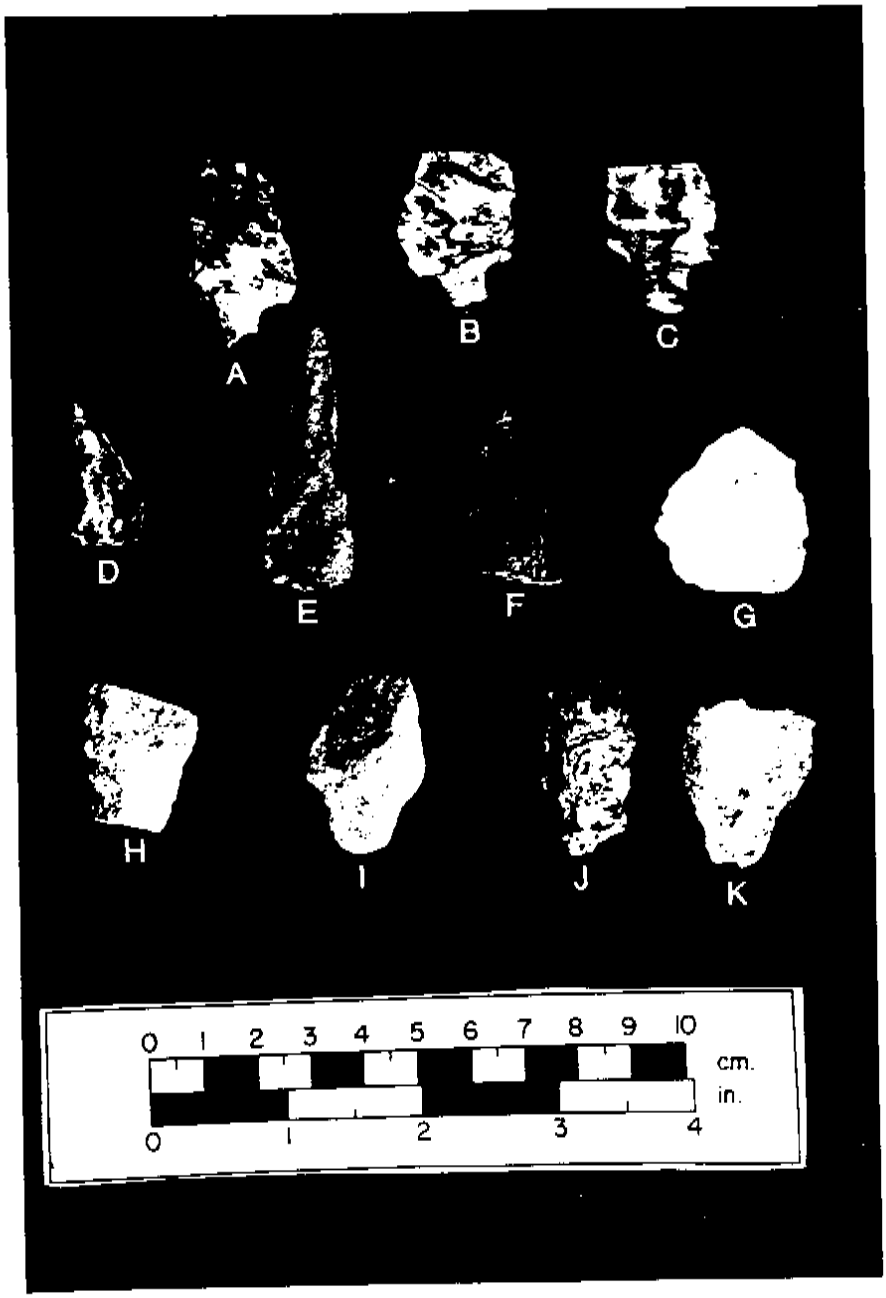


A: Mottled gray, tan, and red jasper Woodland I projectile point found at the base of Feature 8. B: Light gray and tan chert, Woodland I projectile point fragment. C: Tan and white chert, Woodland I projectile point fragment. D: Tan and yellow jasper late-stage biface reject (tip). E: Dark reddish ironstone, late-stage biface reject, or biface tip. F: Mottled, dark yellow and red (Iron Hill) jasper biface tip. G: Milky quartz, late-stage biface reject. H: Mottled, light gray and yellow, quartzite biface mid-section. I: Weathered argillite, Woodland I projectile point fragment. J: Mottled yellow,tan and light gray chert, Woodland I biface fragment. K: Milky yellow quartz late-stage biface reject.

A total of 29 features were cataloged on the site. Most of these were found in the line of units closest to Route 13, and apparently represented a fence along the road or road sign posts. All other features, except for Feature 8, contained no cultural material and were classified as natural soil disturbances. No features were found on the gravelly slope of the knoll to the west.

Feature 8 was a concentration of 45 fire-reddened and fire-cracked cobbles in a pit (Plate 4). The stones were mapped and photographed as they were excavated in a series of layers (Plate 5). The stones averaged 1419 grams with a standard deviation of 1066 grams (see Appendix I). Most of the stones are quartzite cobbles. Initially a soil stain was seen when the feature was identified as a cluster of rocks at the base of the plow zone. The stain disappeared as the stones were removed and the excavators felt that the stain was actually a plow zone remnant in the feature depression. The feature pit was circular, 50 cm in diameter, with a maximum depth of 59 cm (39 cm below the base of the plow zone). At the base of the pit was a Woodland I stemmed point made of jasper (Plate 3).

Most of the artifacts recovered on the site were confined to a semicircular area bordered on the east by Route 13. Over 67 percent of all cultural material was recovered within a 620 square meter area. None of the test units outside of this area had artifacts below the plow zone. The twenty-six units that fell within the core area of the site constitute a 0.42 percent sample of the area. Feature 8 was in the northern half of the core site area. The construction of present Route 13 probably destroyed at least half of the site.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cm.
in.
0 1 2 3 4

TABLE 4

Parkway Gravel Site (7NC-G-100)

Total Prehistoric Artifact Counts

	Quartzite	Quartz	Chert	Jasper	Argillite	Ironstone	Chalcedony	Other	Total
Flakes	96(13)	82(18)	43(14)	76(30)	1	12	20(1)	1	**331(76)**
Utilized flakes	1(1)	6(1)	2(1)	6(3)	--	4(2)	--	--	**19(8)**
Flake tools	--	4(3)	--	6(2)	--	--	1	--	**11(5)**
Woodland I points	--	--	1	1	1	--	--	--	**3**
Early stage biface reject	--	3(3)	1	2(2)	--	--	1(1)	--	**7(6)**
Late stage biface reject	--	--	--	3(1)	--	1	--	--	**4(1)**
Other bifaces	1	1	--	--	--	--	--	--	**2**
Miscellaneous stone tools	2	--	--	--	--	--	--	--	**2**
Shatter	--	77(4)	1	--	--	--	--	--	**78(4)**
Cores	--	5(1)	2	1(1)	--	--	--	--	**8(2)**
Total	100(14)	178(30)	50(15)	95(39)	2	17(2)	22(2)	1	**465(102)**

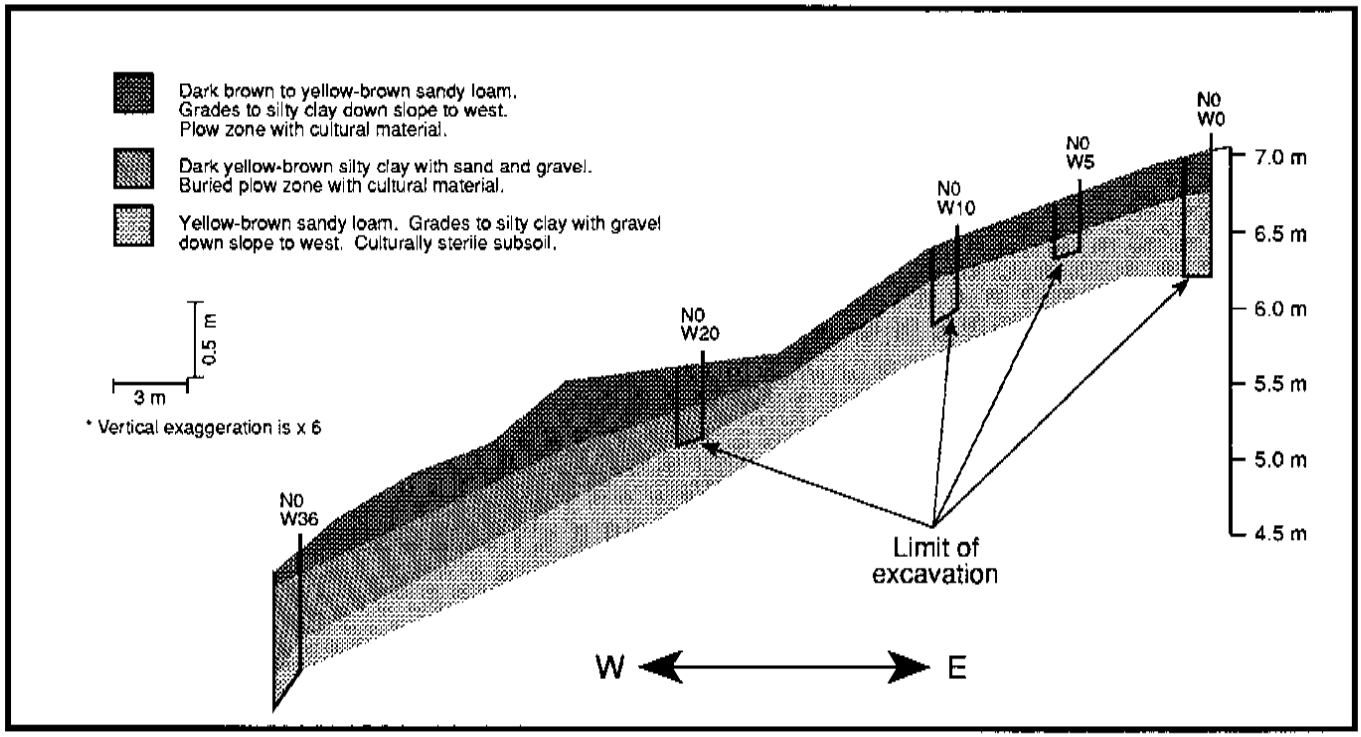
(#) = # with cortex

Fire-cracked rock (count/ weight) : 357/ 22177.0 g

Other: 3 gunflints
3 fragments of flaked glass

FIGURE 11

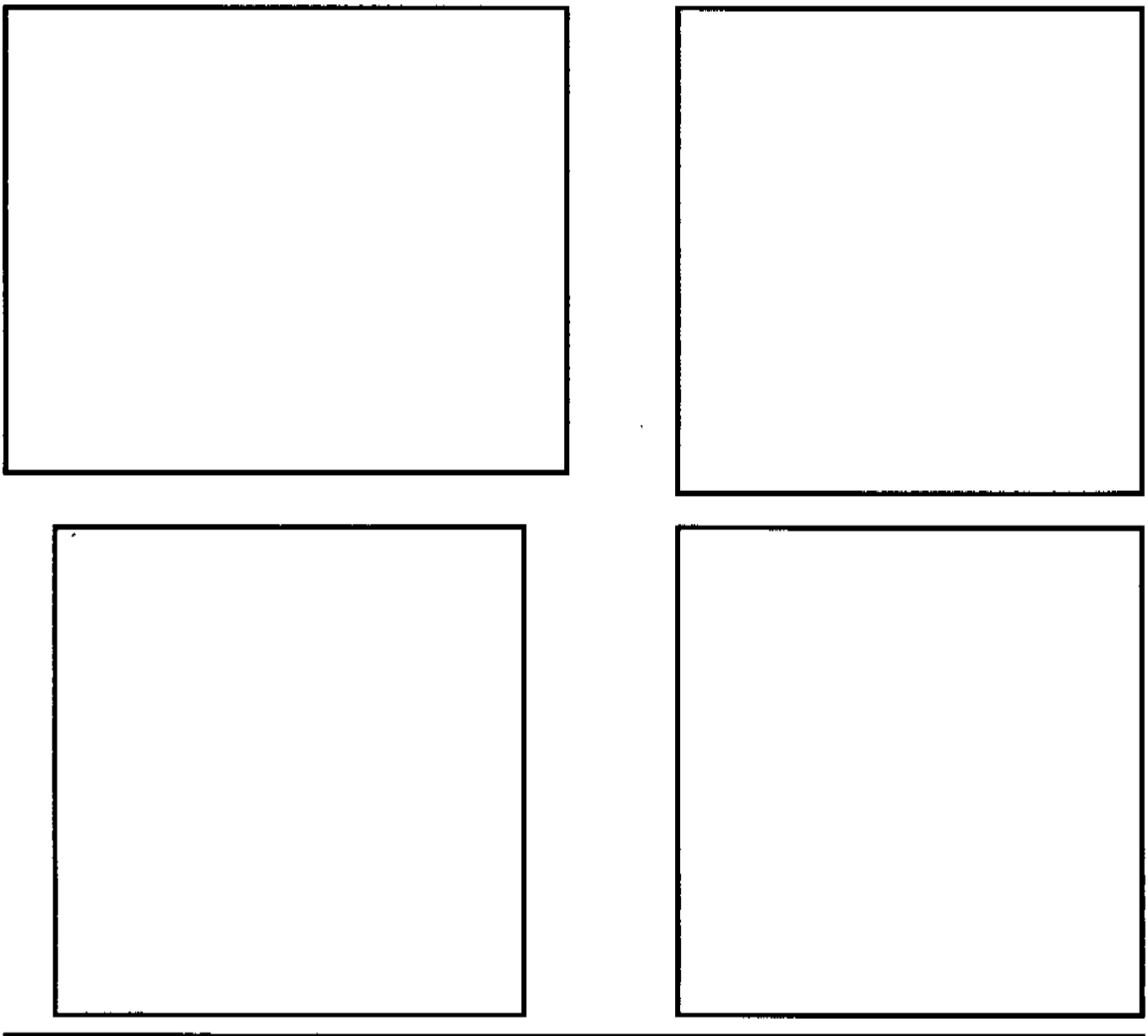
Stratigraphic Profile of the Parkway Gravel Site (7NC-G-100)



Artifacts were recovered from the upper two strata of the site. The yellow-brown sandy loam did not yield any artifacts during excavation.

PLATE 4

Steaming Pit (Feature 8) at the Parkway Gravel Site (7NC-G-100)



The four photographs show the sequence of excavation and configuration of fire-reddened quartzite cobbles in the feature pit. The Woodland I projectile point, labeled A in Plate 3, was under the last stone removed from Level 4.

A variety of lithic materials were worked on the site (Table 4). Quartzite, quartz, and jasper dominated the assemblage. Note that only 3.6 percent of the flakes were ironstone. Evidence of cobble cortex was seen on 23.6 percent of the flakes. A random sample of 100 flakes was selected for flake attribute analysis following the methods described in Custer and Lowery

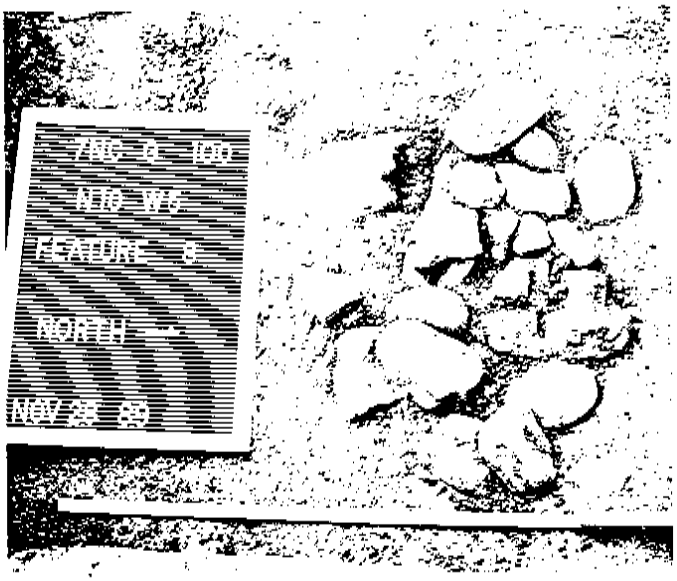
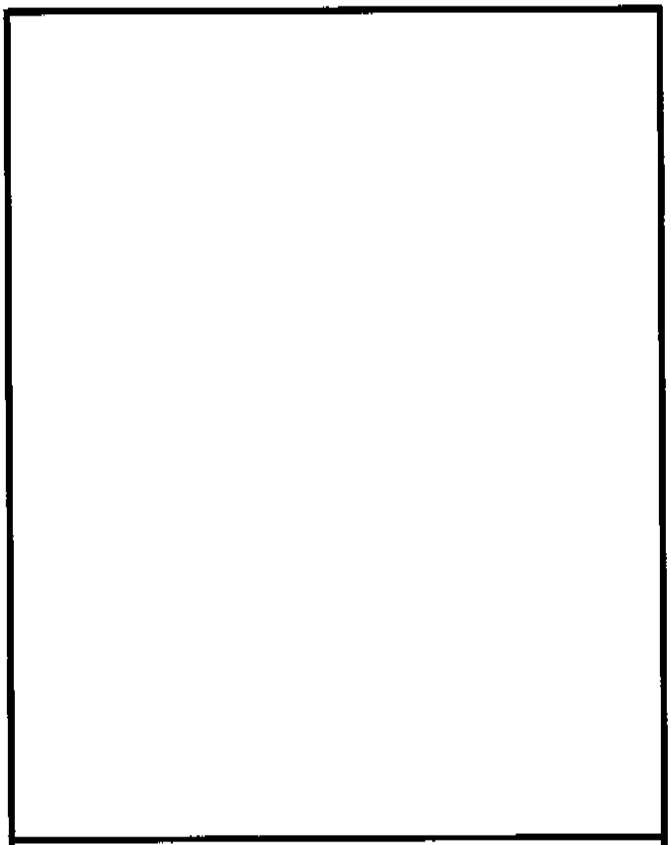

NEO W6
FEATURE 8
NORTH
NOV 28 89

PLATE 5

Mapping Feature 8 at the Parkway Gravel Site (7NC-G-100)



Mike Scholl is recording the three-dimensional coordinates of the fire-reddened stones as they are removed from the feature pit. Stewart Deats is using a line level to measure the depth below surface of a stone in the feature.

(1990). The results are summarized in Table 5, and data are listed in Appendix II. The flake analysis shows that cobble reduction was taking place at the Parkway Gravel site. Traces of cortex were found on 37 percent of the flakes analyzed. The number of remnant flake scars on each flake — averaging 2.21 — suggests more than just rough shaping of blanks from cobble cores. However, the directions count does not reflect reduction into completed bifaces.

Re-examination of the historical material recovered from the Phase I and II collections from the site while analyzing the prehistoric tools turned up three pieces of blown bottle glass with evidence of flaking (Figure 12 and Plates 6 & 7). The glass is dark green with a weathered patina. Two of the pushed-up bases were formed on "sand" pontils (Jones 1991). The other very steep push-up was formed on a glass pontil and a trace of dark blue glass was left on the base. One base is from a square bottle with a nearly flat bottom and could be from a form that was common prior to the mid-seventeenth century (Noel-Hume 1978:62). The other two bases may date to the early eighteenth century, but all could be later and it is difficult to determine the age of these fragments (George Miller, personal communication).

Flaking occurs on all three bottle bases. On the flat-based fragment retouch occurs along a 3.2 cm long section running from the edge of the base towards the center and forms a small spur (see Appendix III for full descriptions). Other flakes occur somewhat randomly on the piece. All flake scars are patinated and weathered. The other two bottle bases do not show clear working edges, but have some possible purposeful flaking. One piece has a series of flakes forming a steep angled edge; however, the flakes are fresh and are probably due to plow or other post-depositional damage.

TABLE 5

Summary Statistics for Flake Attribute Analysis

Parkway Gravel Site
7NC-G-100

	Number of Directions	Number of Scars	Size Class	Size of mm Class
Minimum	0	0	1	1
Maximum	4	7	5	9
Range	4	7	4	8
Mean	1.79	2.21	2.67	3.81
Median	2.00	2.00	3.00	4.00
Variance	1.00	1.74	0.71	3.13
Standard deviation	1.00	1.32	0.84	1.77
Standard error	0.10	0.13	0.08	0.18
Skewness	0.06	0.75	0.89	0.95
Kurtosis	-0.92	1.43	0.55	0.70
Coefficient of variation	0.56	0.60	0.32	0.46

Dragon Run North B Site
7NC-G-104

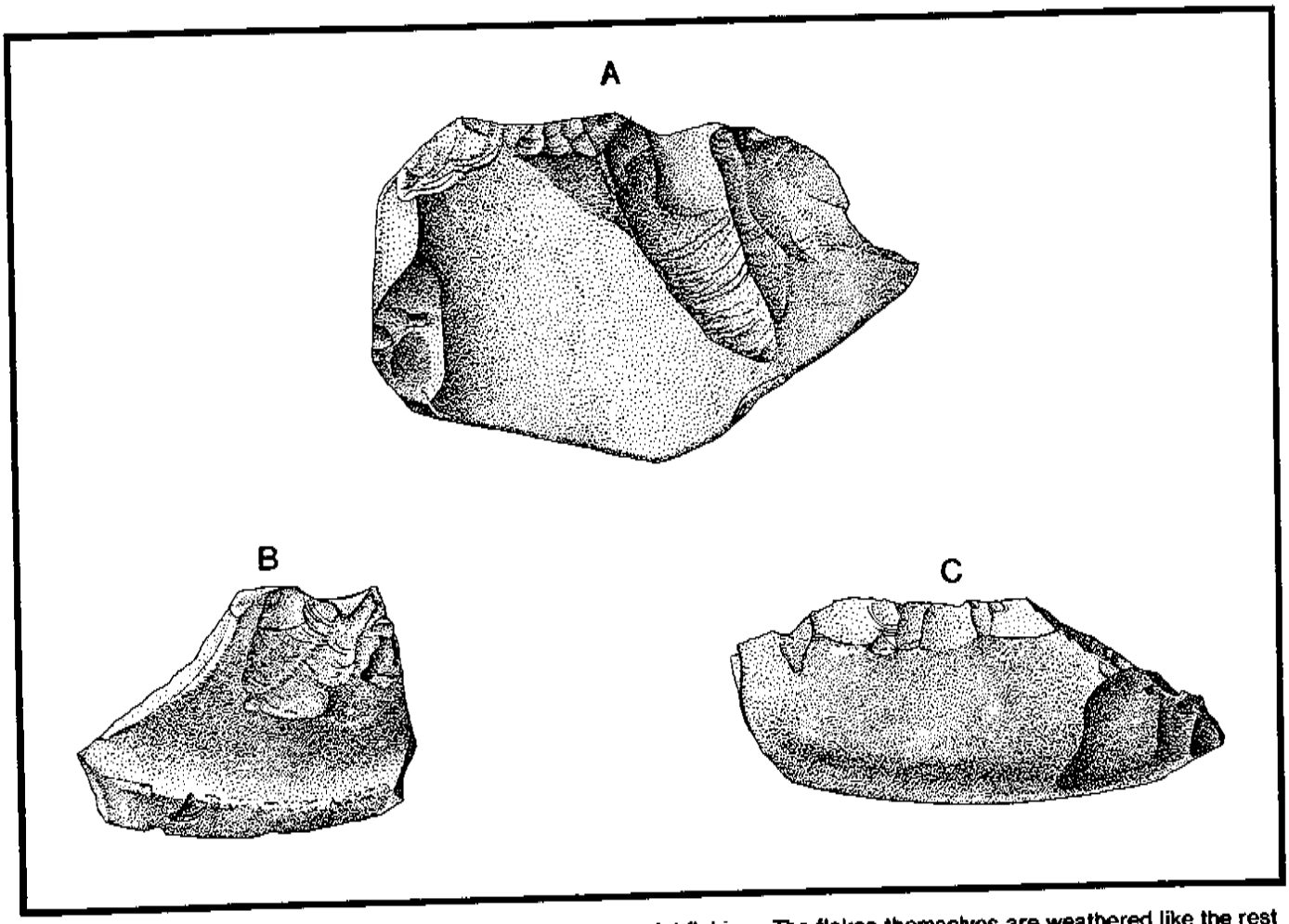
	Number of Directions	Number of Scars	Size Class	Size of mm Class
Minimum	0	0	2	2
Maximum	5	5	5	9
Range	5	5	3	7
Mean	1.59	1.81	2.95	4.36
Median	1.00	2.00	3.00	4.00
Variance	0.79	1.10	0.63	2.72
Standard deviation	0.89	1.05	0.80	1.65
Standard error	0.09	0.11	0.08	0.16
Skewness	0.81	0.65	0.57	0.57
Kurtosis	1.27	0.32	-0.06	0.00
Coefficient of variation	0.56	0.58	0.27	0.38

Based on a sample of 100 flakesfrom each site. See Appendix B for raw data and key to variable coding.

Other evidence suggesting a Contact Period occupation of the site are a gunflint found during the Phase I survey, and two other possible gunflints recovered during Phase II (Plate 6). The gunflint recovered in the Phase I surface collection is mottled, light gray, burnt English flint with a shallow concavity battered on one side. Of the possible gunflints found during Phase II excavations one is made of quartz and the other is a battered pebble, possibly of local chert or jasper (Appendix III).

FIGURE 12

Flaked Bottle Glass from the Parkway Gravel Site (7NC-G-100)

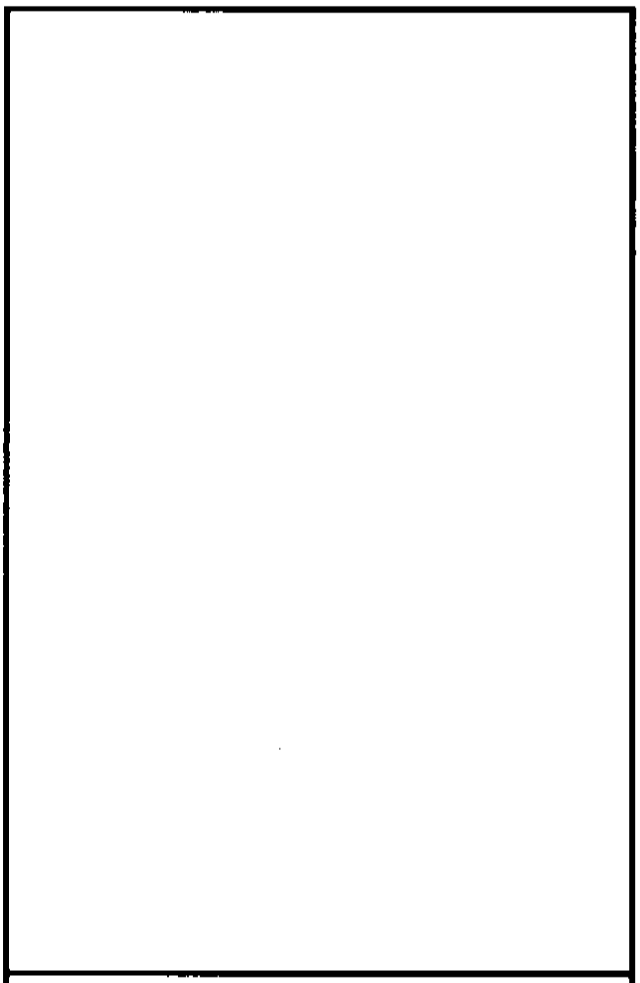


Only bottle bottom A (top) has clear evidence of purposeful flaking. The flakes themselves are weathered like the rest of the glass fragment. Bottle bottom B has only a few random flakes. The flakes on bottle bottom C are unweathered and clearly not old.

An analysis of all historical artifacts and debris collected from the site in both Phase I and II research identified two distinct assemblages. Most of the glass from the site dated from the late nineteenth and twentieth centuries. In addition to the three dark green bottle bases described earlier, two other pieces of glass date to the eighteenth century. The majority of the historical ceramic artifacts from the site were redwares which are not diagnostic of any particular time period. However, seven sherds date to the eighteenth century — two fragments of Chinese porcelain, four scratch-blue, white salt-glazed stoneware sherds, and one fragment of tin-glazed ceramics. The tin-glazed fragment could date from the seventeenth century. The dark green bottle glass with possible flaking could be contemporaneous with the eighteenth-century material from the site. Hence, an occupation in the first half of the eighteenth century is indicated.

PLATE 6

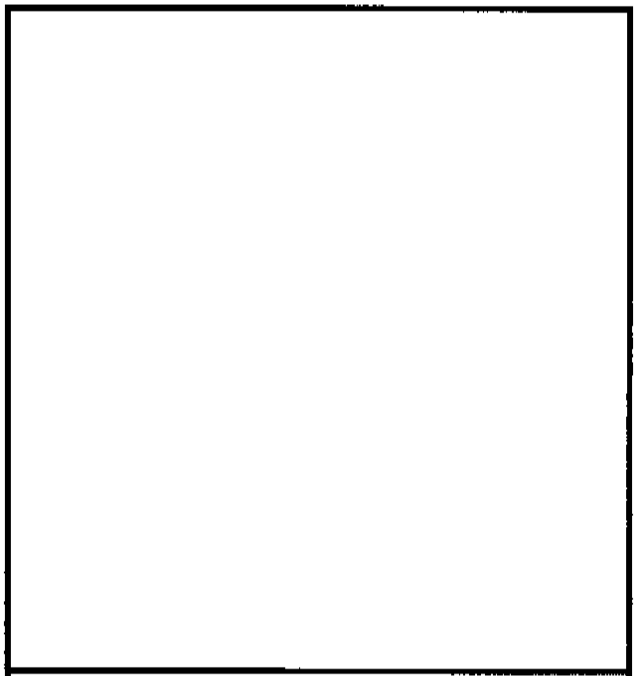
Possible Contact Period Artifacts from the Parkway Gravel Site (7NC-G-100)



A: Weathered white and light gray, burned, English flint gunflint. B: Possible gunflint made from a dark gray chert pebble with yellow quartz inclusions; battered along the right side. C: Possible gunflint of milky quartz. D & E: Dark green, hand-blown, bottle glass bottom with some possible flaking. F: Dark green, hand-blown, case bottle bottom fragment with a working edge flaked on the upper left corner (see Plate 7 and Figure 12).

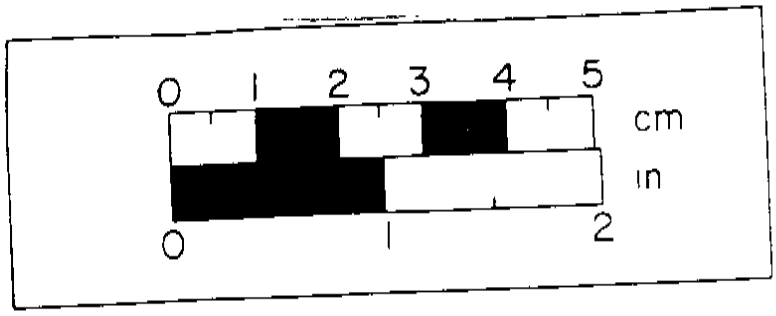
PLATE 7

Close-Up of Flaking on Case Bottle Bottom from the Parkway Gravel Site (7NC-G-100)



The sequence of small flakes along the left half of the upper edge of the piece appear intentional, and create the working edge of a flake tool. Other flakes from the piece of glass may be accidental. One edge of the square bottle bottom is on the left.. The piece is also shown in Plate 6 and in Figure 12.

Discussion: The Parkway Gravel site (7NC-G-100), although covering about the same area as the first four sites discussed above — roughly 1000 square meters, contained approximately 35-50 times more cultural material. In addition, subsurface features were constructed representing a more substantial investment in time and energy on the site. Feature 8, the pit filled with heat-altered cobbles, may have been used for cooking or for a steam source for a sweat lodge, perhaps in a curing ceremony or other ritual. More than 40 stones, some weighing as much as nine pounds, were transported from somewhere off the site to fill the pit. Activities conducted on the site included tool manufacture and maintenance. Raw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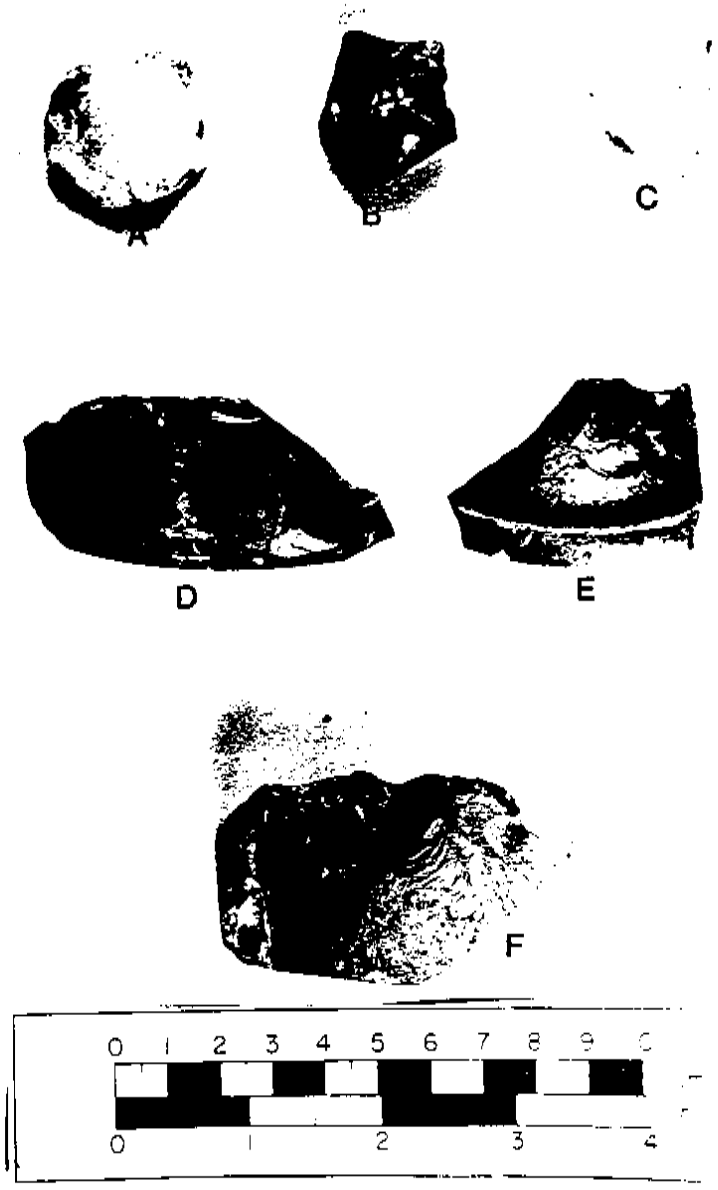
cm
in
0 1 2


A
B
C
D
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F
0 1 2 3 4 5 6 7 8 9 0
0 1 2 3 4

materials were probably taken from local stream gravels — perhaps from the same source as the quartzite cobbles that dominate Feature 8. Quartzite flakes constitute 29 percent of the total flake collection from the site.

The site was either used by a larger group of people than the other small sites described earlier, or visited more frequently and\or repeatedly over a span of time. The site's location on Scott Run provided access to riverine, upland, marsh, and possibly brackish water environments nearby in the St. Georges River. The site may have been a staging area from which smaller groups set out on hunting and gathering forays. The presence of a single projectile point at the base of a possible sweat lodge feature could indicate ceremonialism associated with hunting trips either to bring luck or celebrate success.

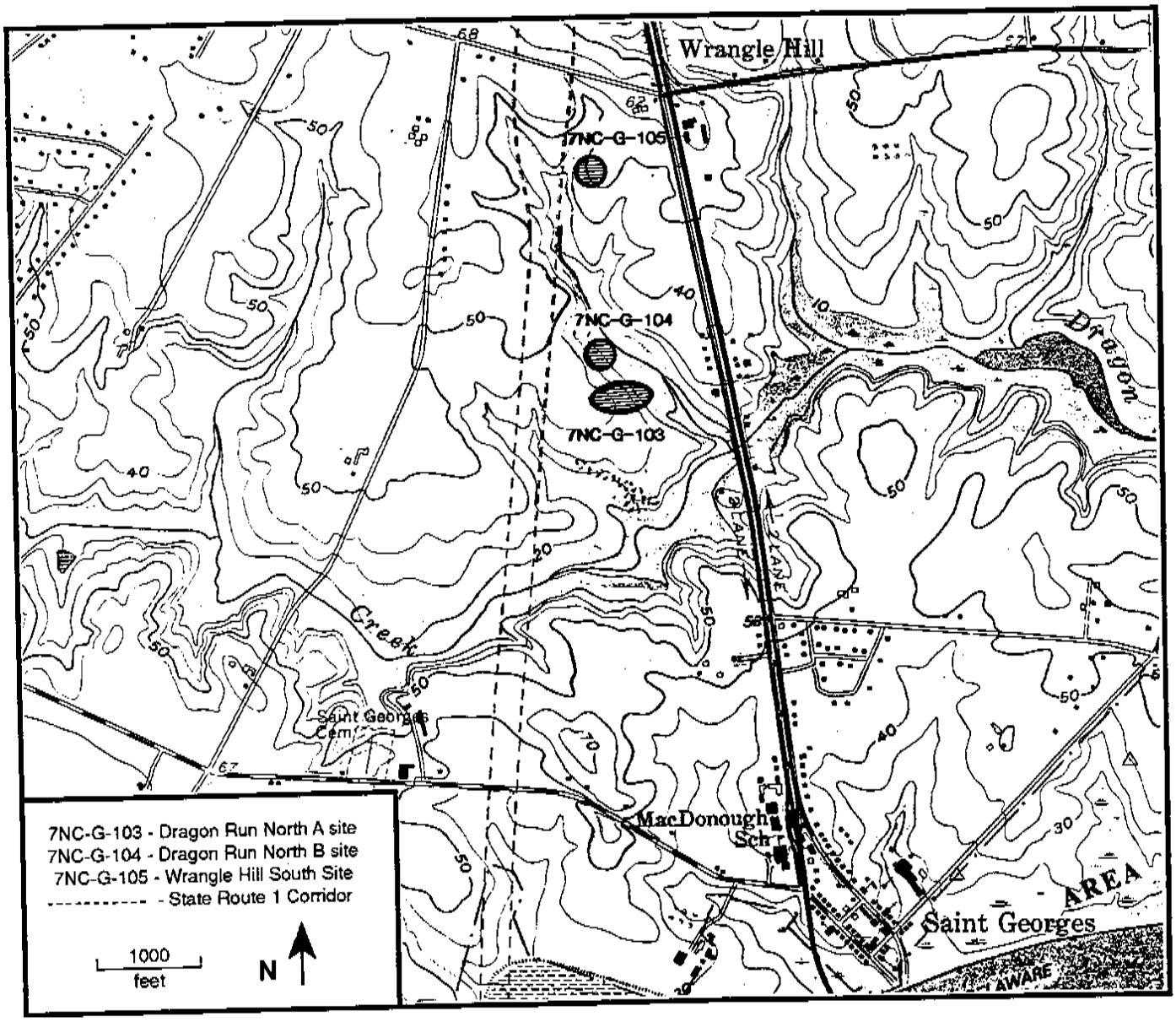
The flaked glass and gunflints suggest an aboriginal occupation in the early eighteenth century. The first land grants in St. Georges Hundred were made in 1646 by William Kieft, the Dutch Governor. The land on which the site occurs may have been part of a grant to Peter Alrichs before 1682 (Scharf 1888:982). In 1683 there were 50 taxable citizens, representing approximately 250 people in St. Georges Hundred (Scharf 1888:982). The town of St. Georges, originally known as Quinquenium — an Indian name, was settled sometime before 1700, but the exact date is not known (Scharf 1888:967-969). A road was ordered built in 1675 between New Castle and Odessa crossing at St. Georges River. The inhabitants of the area were supposed to build the road but apparently no action was taken until after 1679 when the route was broken into sections and overseers assigned. The inhabitants of St. Georges were assigned to the section north to Red Lion under James Crawford (Scharf 1888:414). Scharf (1888:983) relates that the Dilworth house located about a mile and a half west of Port Penn, "was built at a time when protection from the Indians was a necessity." The house stands on land first surveyed in 1675 (Scharf 1888:982). Herman (1987:16) dates the Dilworth house to about 1714, but makes no mention of "loop holes" or gun ports. Documented historical occupation along Scott Run began in the mid-eighteenth century, but Europeans may have been living in the area somewhat earlier (Dave Grettler, personal communication). The dark green bottle glass may have been collected or traded for at another location and carried to the site to be recycled as lithic raw material. Unfortunately, present Route 13 destroyed the eastern half of the site, and plowing and soil erosion destroyed the context of what remains. A larger sample of the plow zone may have yielded more possible Contact Period material, however, the low density and questionable nature of the artifacts did not warrant additional effort. Further field research is not recommended for the site.

Dragon Run North B Prehistoric Site

Site 7NC-G-104 is 300 meters north of the Dragon Run North A site (7NC-G-103) on the next small knoll above a tributary of Dragon Run Creek (Hodny, Bachman, and Custer 1989:57-59). Prehistoric artifacts were observed in the plowed field to the west and were discovered in 3

FIGURE 13

Location and Setting of the Dragon Run North B Site (7NC-G-104) and Wrangle Hill South Site (7NC-G-105)



of the 13 Phase I shovel test pits in the wooded area next to the bluff overlooking the drainage (Figure 13). Soil profiles in the shovel test pits suggested that a portion of the wooded area had never been plowed. No age could be assigned to the site based on the results of the Phase I work.

Phase II investigations concentrated on the wooded portion of the site where undisturbed contexts were anticipated. A total of 51 square meters were excavated — 48 individual 1x1 m squares plus one square expanded into a 2x2 m unit (Figure 14). The majority of the units were placed in the wooded portion of the site. Based on artifact recovery, the core area of the site covered a roughly triangular area, 40 meters long by a maximum of 20 meters wide (see Figure 14 & 15). Seventeen excavation units fell within this area including the 2x2 m unit.

FIGURE 14

Dragon Run North B Site (7NC-G-104) Phase II Testing

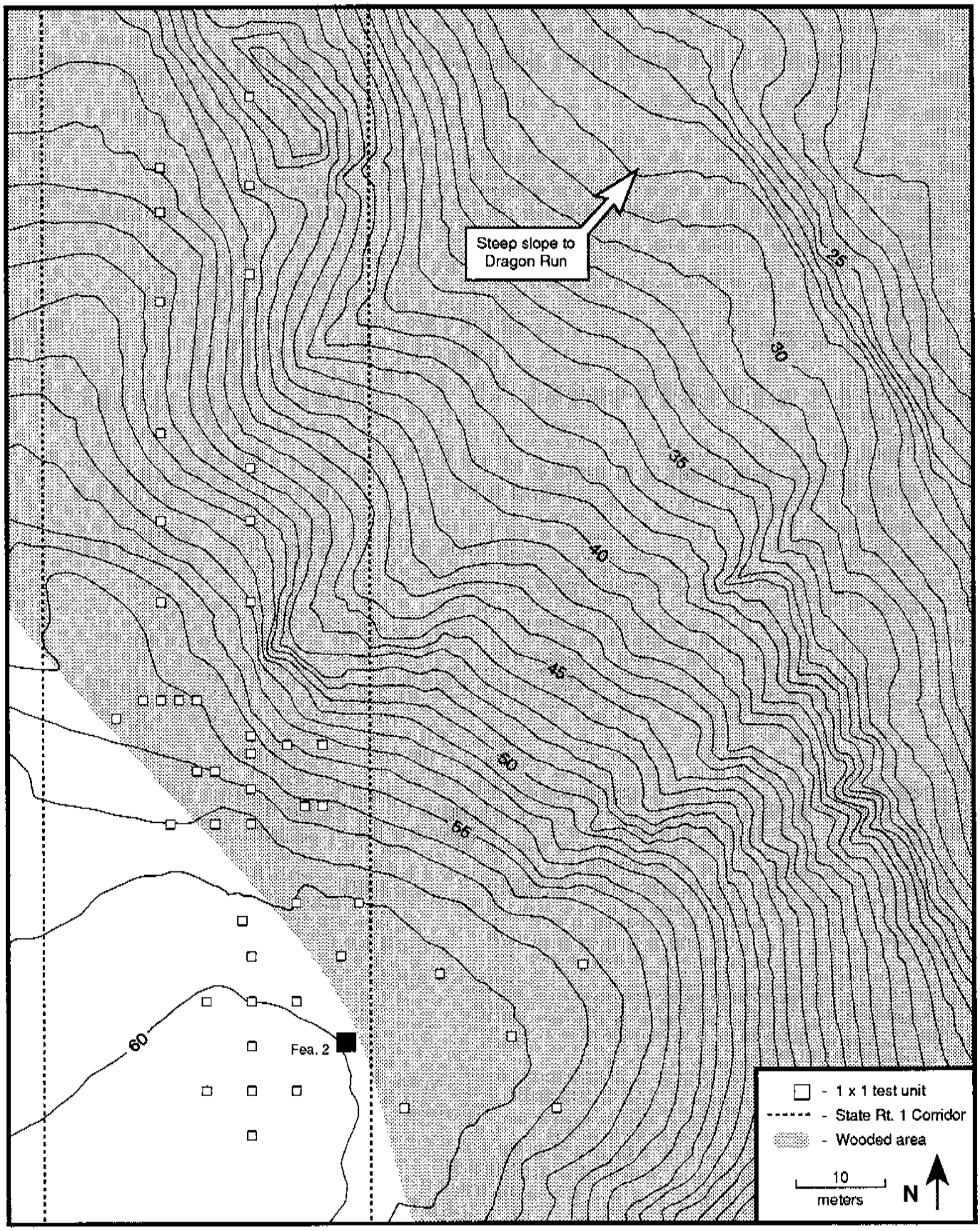
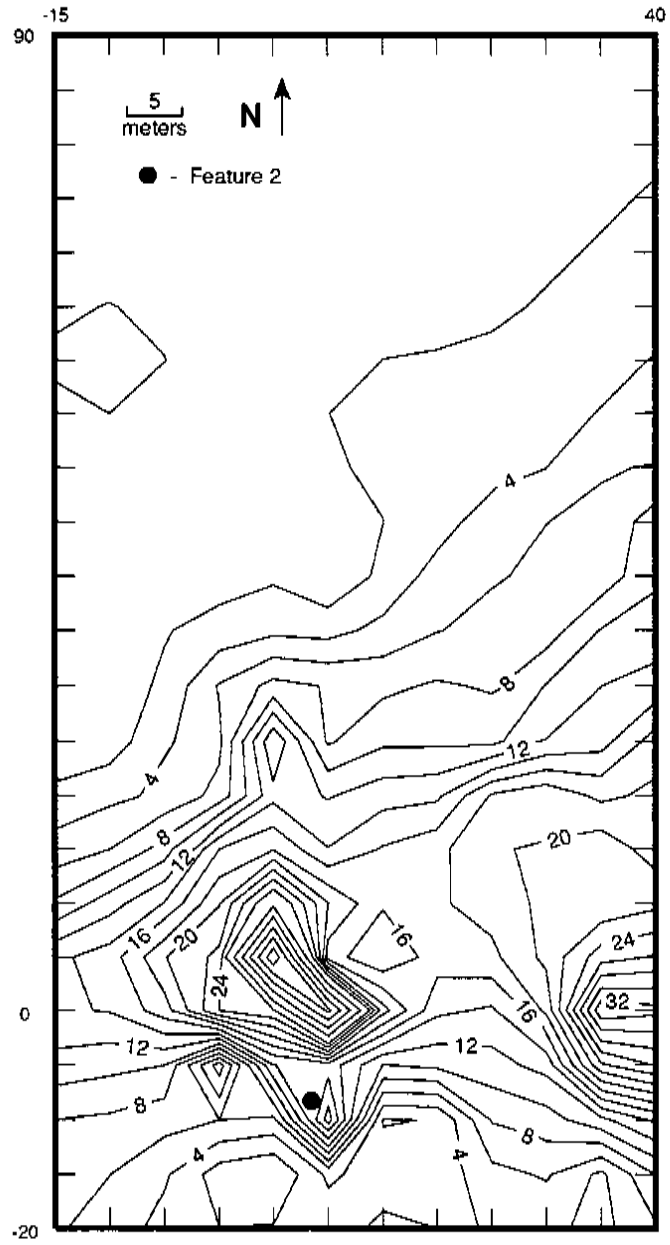


FIGURE 15

Debitage Distribution at the Dragon Run North B Site (7NC-G-104)

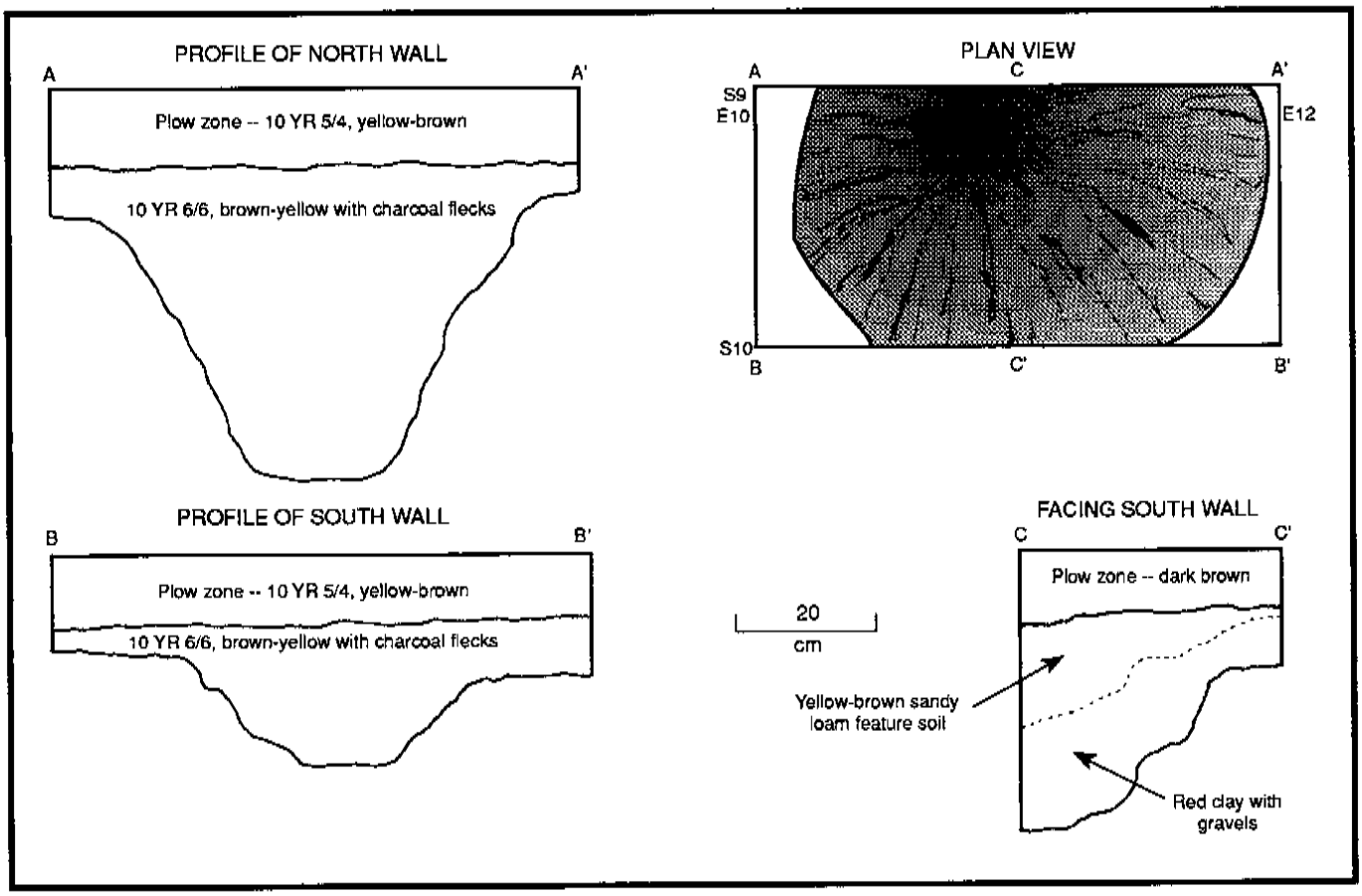


Two features were uncovered. Feature 1 in unit N29W10 was a pit with historical debris. Feature 2 was at the southern end of the core area of the site, and was first seen in Level 4 of unit S10E10. This unit was expanded into a 2x2 m square to uncover the whole feature. The feature was a pit 180 cm in diameter with sloping sides and a flat bottom 145 cm below the surface (Figure 16). The feature fill, a brownish-yellow sandy silt with charcoal flecks, contrasted sharply with the surrounding orange-yellow clayey sand and gravel. Artifacts from within the feature included fire-cracked rock, flakes of a variety of materials, and a quartzite early-stage biface reject. A subtle stratigraphy in the feature suggests that the pit was left open after use and filled first when gravelly sediments from the sterile subsoil forming the feature walls slumped. Later, silty material washed into the remaining depression. Artifacts and charcoal flecks were found only in the darker-colored silty sediments.

Ironstone comprised 89 percent of the waste flakes from stone tool manufacture or maintenance on the site (Table 6). A few other flakes of quartz (3.8%), chert (2.8%), jasper (1.8%), and argillite (1.3%) were found also. The tools recovered from excavations at the site included 12 utilized flakes, 4 flake tools, 9 bifaces, and a hammerstone (Table 6). Only 14 fragments of fire-cracked rock were recovered from the site. The 9 bifaces included 4 Woodland I projectile points and 1 possible Woodland II triangle (Plate 8). The broken Woodland II triangle is made

FIGURE 16

Feature 2, Dragon Run North B Site (7NC-G-104)



of quartz. Results of a flake attribute analysis for the site are summarized in Table 5; the data are given in Appendix II.

The occupation of the site occurred predominately during the Woodland I Period, but some use of the site took place in the later Woodland II Period. Activities on the site include stone tool manufacture and maintenance, as well as food procurement and processing. The overwhelming use of ironstone for tool manufacture and lack of complete tools in the collections from the site suggest that broken tools were being replaced. The three ironstone points were broken. One snapped in half during the final stage of manufacture and the other is missing a tip. The third snapped in half medially during use.

Discussion: The lithic raw materials used at the site contrast sharply with the Parkway Gravel site (7NC-G-100). Less than four percent of the flakes from Parkway Gravel are ironstone, yet the two sites are only 2.25 miles apart (as the crow flies). At Parkway Gravel, raw materials were available in the local gravels exposed in stream beds, and the diversity of material used

TABLE 6

Dragon Run North B (7NC-G-104)

Prehistoric Artifact Counts

	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Total
Flakes	3(2)	15(3)	11(1)	7(2)	1	5	354(125)	396(133)
Utilized flakes	1	1	1	--	1	--	8(4)	12(4)
Flake tools	--	--	--	--	--	--	4(1)	4(1)
Woodland I points	1	--	--	1	--	--	2(1)	4(1)
Woodland II points	--	1	--	--	--	--	--	1
Early stage biface reject	1	--	--	--	--	--	1	2
Other bifaces	--	1	--	--	--	--	3(1)	4(1)
Shatter	--	3	--	--	--	--	--	3
Total	6(2)	21(3)	12(1)	8(2)	2	5	372(132)	426(140)

Fire-cracked rock (count/ weight) 14/ 1948.0 g

Ground stone tools: 1

(#) = # with cortex

Prehistoric ceramics: 1 - Nassawango

reflects the diversity of the gravels. Ward (1985) identified a quarry for fine-grained ironstone on Herring Island near the mouth of the Elk River, in northern Chesapeake Bay. The regional distribution of ironstone documented by Ward (1985) suggested that ironstone biface preforms were an item of trade in the upper Chesapeake and Delmarva Peninsula. Furthermore, ironstone biface forms seem limited to early Woodland stemmed points and broadspears. Breakage of ironstone bifaces at the Hawthorn site in New Castle County, Delaware suggests that ironstone was a preferred material for heavy chopping tools (Custer and Bachman 1984). The implications of ironstone use at the Dragon Run North B site will be discussed later.

The plow zone on the site averaged about 20 cm deep, but was variable ranging up to 35 cm deep in some units (Figure 17). The wooded area had been plowed in the past and so did not yield artifacts in undisturbed contexts as had been hoped. Further research is not recommended due to the agricultural disturbance on the site and the low number of prehistoric features.

SIGNIFICANT SITES

Three sites have been recommended for Phase III mitigation. As of this writing the projects have been completed and analysis has begun. The results of the Phase II research on the sites is summarized here, but detailed analyses are left for the final reports on the three sites.

PLATE 8

Prehistoric Artifacts from the Dragon Run North B Site (7NC-G-104)

A: Two fragments of the same Woodland I, ironstone biface; the two pieces were found together. B: Contracting stemmed, Woodland I ironstone biface. C: Ironstone early-stage biface reject; note the lighter colored area of cortex on the face of the artifdact. D: Woodland I, ironstone biface fragment. E: Mid-section of an ironstone biface. F: Mottled red and yellow (Iron Hill) jasper, Woodland I projectile point base. G: Milky quartz, side-notched Woodland I projectile point. H: Tan and reddish purple, quartzite early-stage biface reject. I: Dark gray chert, Woodland I projectile point.

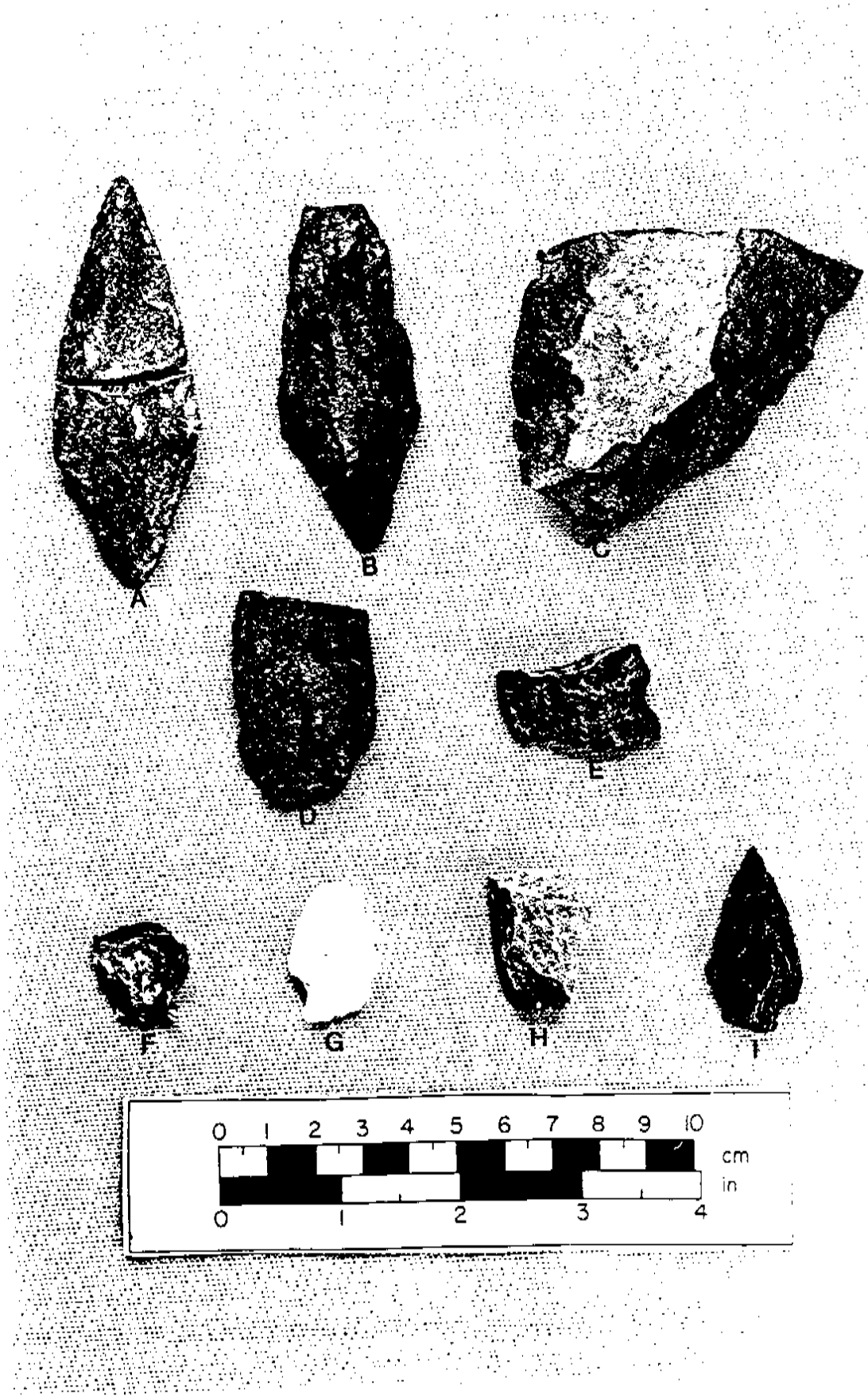

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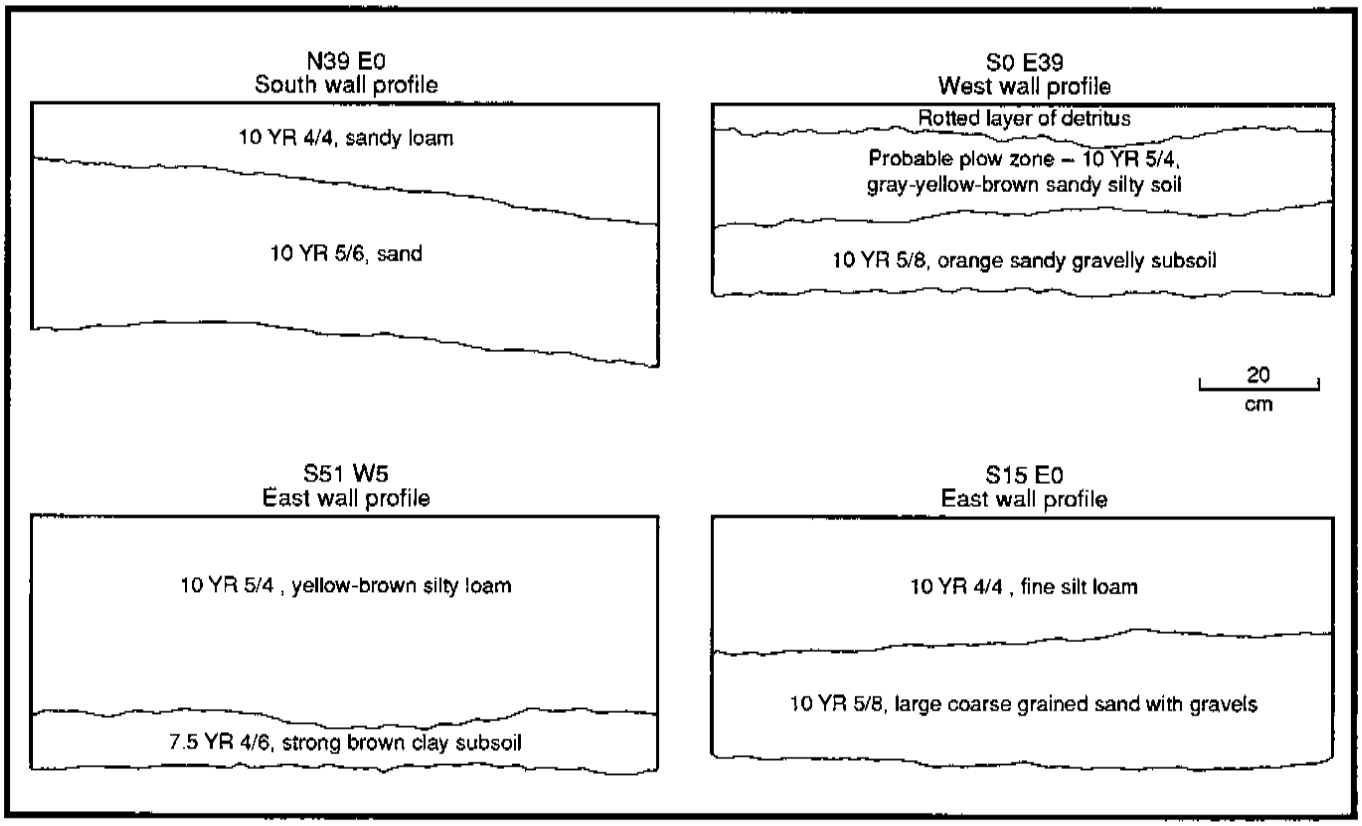
FIGURE 17

Typical Soil Profiles from the Dragon Run North B Site (7NC-G-104)



Artifacts were found predominantly in the upper stratum of the site -- the plow zone. The top stratum of rotted detritus in square S0 E39 resulted from leaves and other debris on the forest floor.

Wrangle Hill South Prehistoric Site

Site 7NC-G-105 was identified in 18 shovel test pits excavated at the end of a broad slope to the scarp above the confluence of two ephemeral drainages (Hodny, Bachman, and Custer 1989:59-62). Artifacts recovered during the Phase I investigations consisted of seven flakes from the plow zone of three shovel test pits. The tight cluster of artifacts and their location on low order streams suggested a procurement site.

Twenty-nine 1x1 m units were excavated to better define the site limits and explore the sediments of the site (Figure 18). Twenty-three of the squares contained artifacts in the first level excavated below the disturbed plow zone. Six of these also had artifacts in the second level below the plow zone. Three units were expanded into 2x2 m squares without screening the plow zone to expose features. Four features were defined. Features 1, 2, and 3 are prehistoric pits (Figure 19). Feature 4 is actually a lens of light-colored, silty fine sand that overlies the reddish sandy clay underlying the whole site.

FIGURE 18

Wrangle Hill South Site (7NC-G-105) Phase II Testing

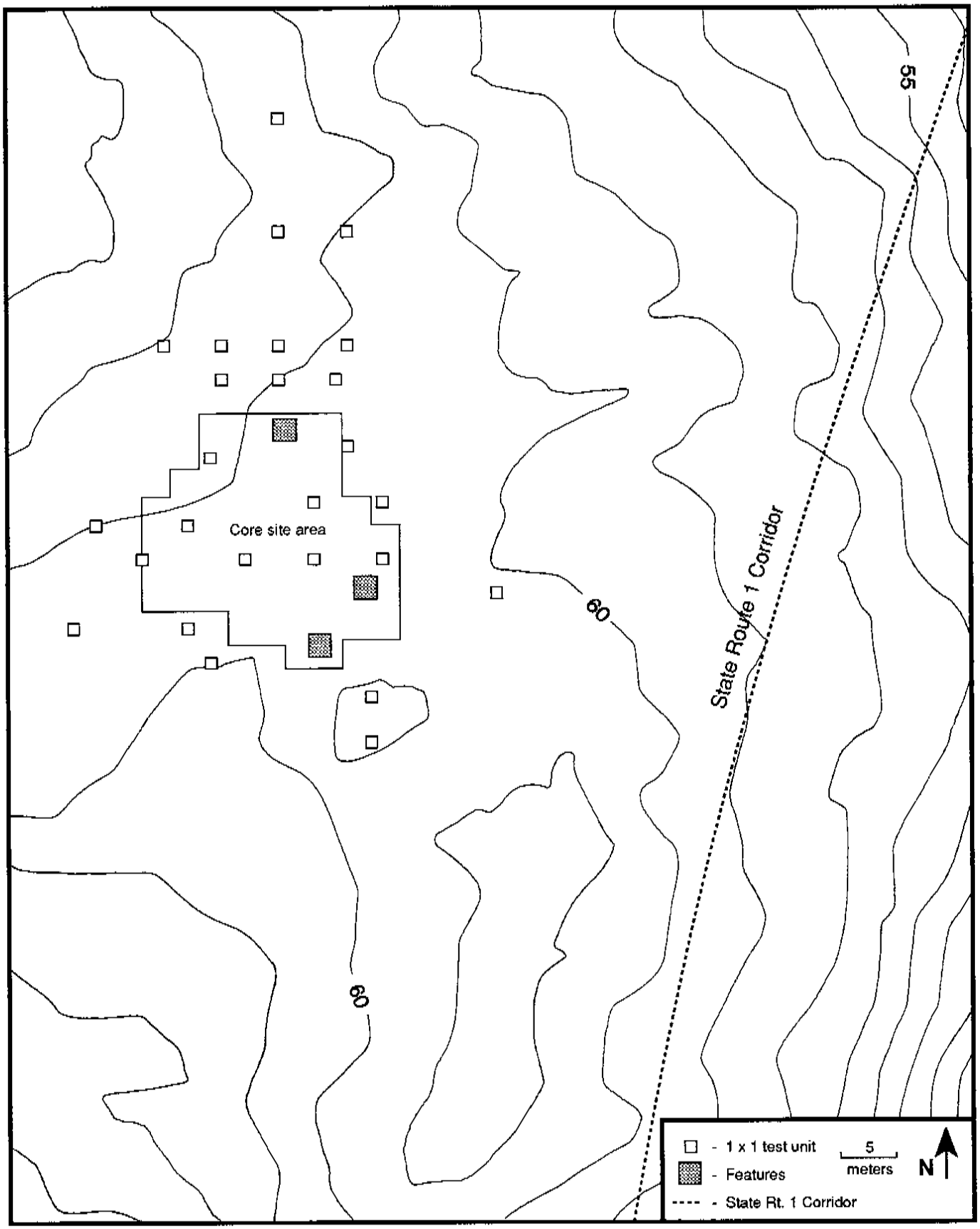
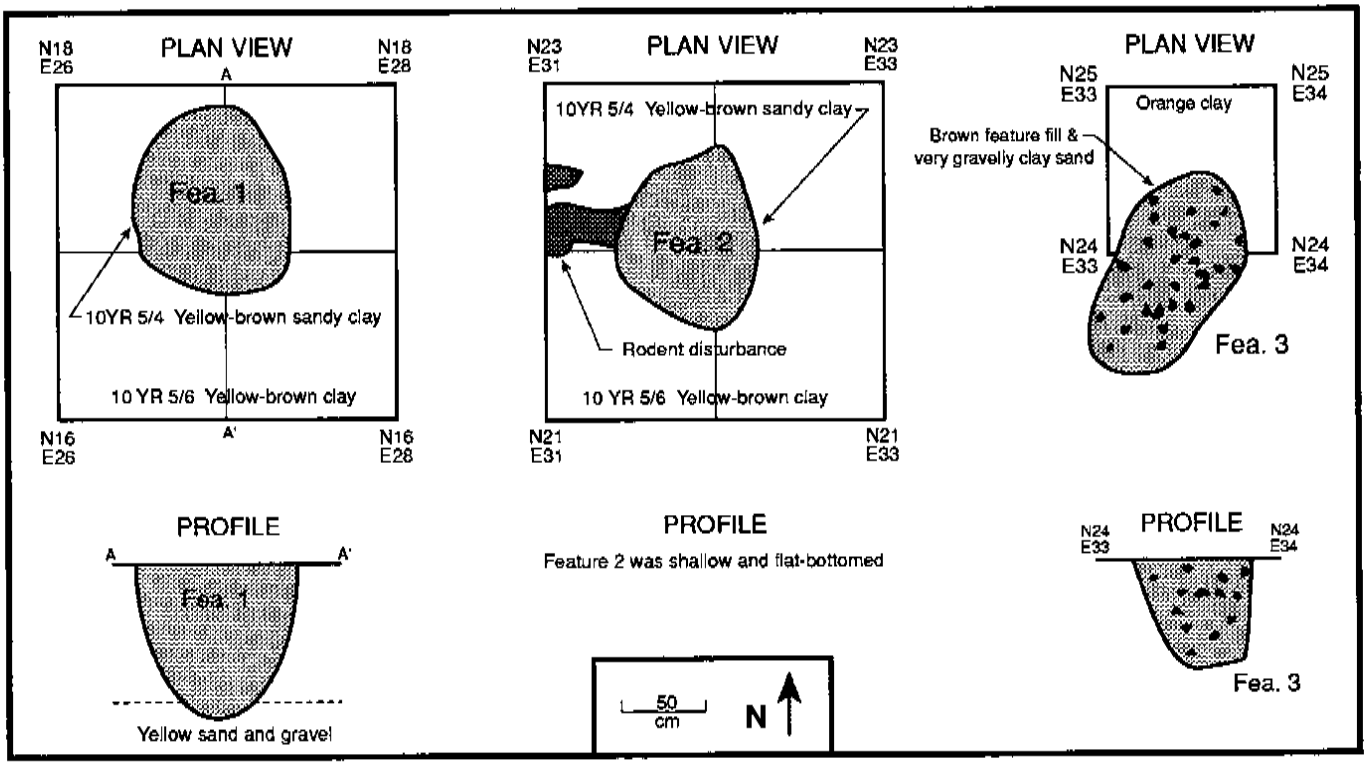


FIGURE 19

Wrangle Hill South Site (7NC-G-105) Features



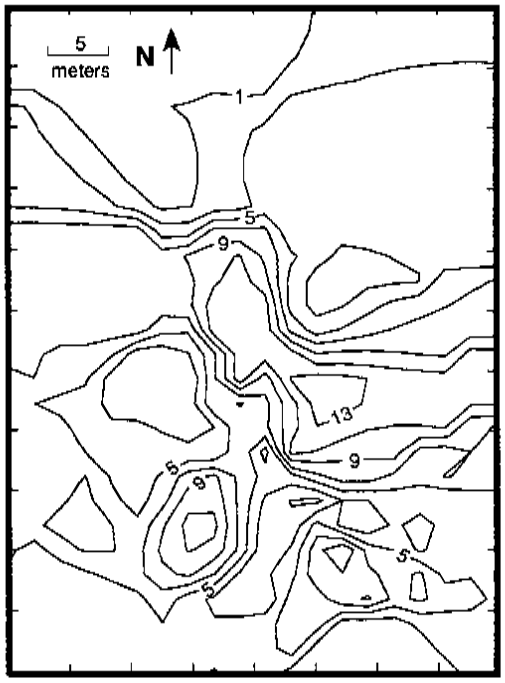
Feature 1 was a straight-sided pit, 1.1 m in diameter and 1.2 m deep with a rounded bottom. The medium brown, sandy clay fill was flecked with charcoal. Stone flakes, fire-cracked rock, ceramic sherds, and a hammerstone were found within the feature.

A shallow, roughly circular pit approximately 1 m in diameter was designated Feature 2. The feature fill was yellowish-brown silty sand with charcoal flecks. The feature contained three flakes, one flake tool, and one weathered argillite biface. A rodent disturbance intruded into the feature from the west.

Another pit, Feature 3, was a straight-sided oval measuring 1.25 x 0.55 m (Figure 19). The pit extended 50 cm below the plow zone and was flat bottomed. The fill was brown, clayey sand with abundant gravel and some charcoal. A large fragment of fire-cracked rock and burnt soil was encountered at the base of the plow zone at the northwest end of the feature stain. Only one quartzite core was found in the feature.

Feature 4 was a 20-30 cm thick lens of yellow-brown silty clay with some gray mottling of organic matter. The soil covered the entire floor of Unit N36E24 in which it was first encountered. Shovel trenches were excavated through the plow zone in three directions (Figure

FIGURE 20
Debitage Distribution at the Wrangle Hill South Site (7NC-G-105)



18) to determine the extent of Feature 4. The silty clay soil is estimated to cover a 10-15 square meter area. The soil is distinctive in color and consistency from the underlying sediments which are mottled orange, compact silty clays. No cultural material was found within or beneath Feature 4.

Based on artifact density, the core of the site was defined as a diamond-shaped area of about 400 square meters (See Figure 20). Features 1-3 fell within this area, and Feature 4 occurred at the northern point of the diamond. Cultural material recovered from the site includes 167 flakes of a variety of material (5% ironstone), five bifaces, and six fragments of prehistoric ceramic artifacts (Table 7). The prevalence of ironstone among the lithic raw materials is unusual for the region as discussed previously. The bifaces are not distinctive--two ifaces are tips only, but all probably date to the Woodland I Period. five fragments of Nassawango ceramics and one possible Coulbourn sherd were recovered in Feature 1.

The occupation of the Wrangle Hill South site occurred predominately during the Woodland I Period based on the biface forms and ceramic artifacts. Nassawango ceramics are associated with the Delmarva Adena complex, and are probably transitional between earlier Wolfe Neck and later Coulbourn ceramics in southern and central Delaware (Custer 1989:166,173). The Delmarva Adena complex is distinctive for its burial ceremonialism and trade goods and is best known from burial sites (Custer 1989:256-275). Only a few Adena micro-band base camps are known from southern Delaware, and no Adena procurement sites are known on the Delmarva Peninsula (Custer 1989:256-258).

Another important characteristic of the Wrangle Hill South site is the density of subsurface features. In a 4 percent sample of the core area of the site three pit features were located. Therefore, a total of 70 features can be estimated within the 400 square meters of the core area (1/0.04 x 3 = 70.6). This stands in stark contrast to the other six small prehistoric sites described earlier in this report.

A third significant characteristic of this site is the intact lens of soil designated Feature 4. Plowing on the site has not completely destroyed the original sedimentary sequence of the locality, thus the potential exists for undisturbed cultural deposits.

TABLE 7

Wrangle Hill South Site (7NC-G-105)

Total Prehistoric Artifact Counts

	Quartzite	Quartz	Chert	Jasper	Argillite	Ironstone	Chalcedony	Other	Total
Flakes	16(1)	18(2)	4	15	1	92	5	16(1)	167(4)
Utilized flakes	2	7(1)	--	2(1)	--	4	--	3(1)	18(3)
Flake tools	2	4	2	2(1)	--	1	--	2	13(1)
Woodland I points	--	--	--	1	--	1	--	--	2
Other bifaces	1	1	--	--	1	--	--	--	3
Miscellaneous stone tools	--	--	--	1	--	--	--	--	1
Shatter	--	1	--	--	--	--	--	--	1
Cores	2(1)	--	--	--	--	--	--	--	2(1)
Total	23(2)	31(3)	6	21(2)	2	98	5	21(2)	207(9)

(#) = # with cortex

Ground stone tools: 1 - possibly fire-cracked

Prehistoric ceramics: 5- Nassawango
1- possible Coulbourn

Fire-cracked rock (count/ weight): 18/ 3576.0 g

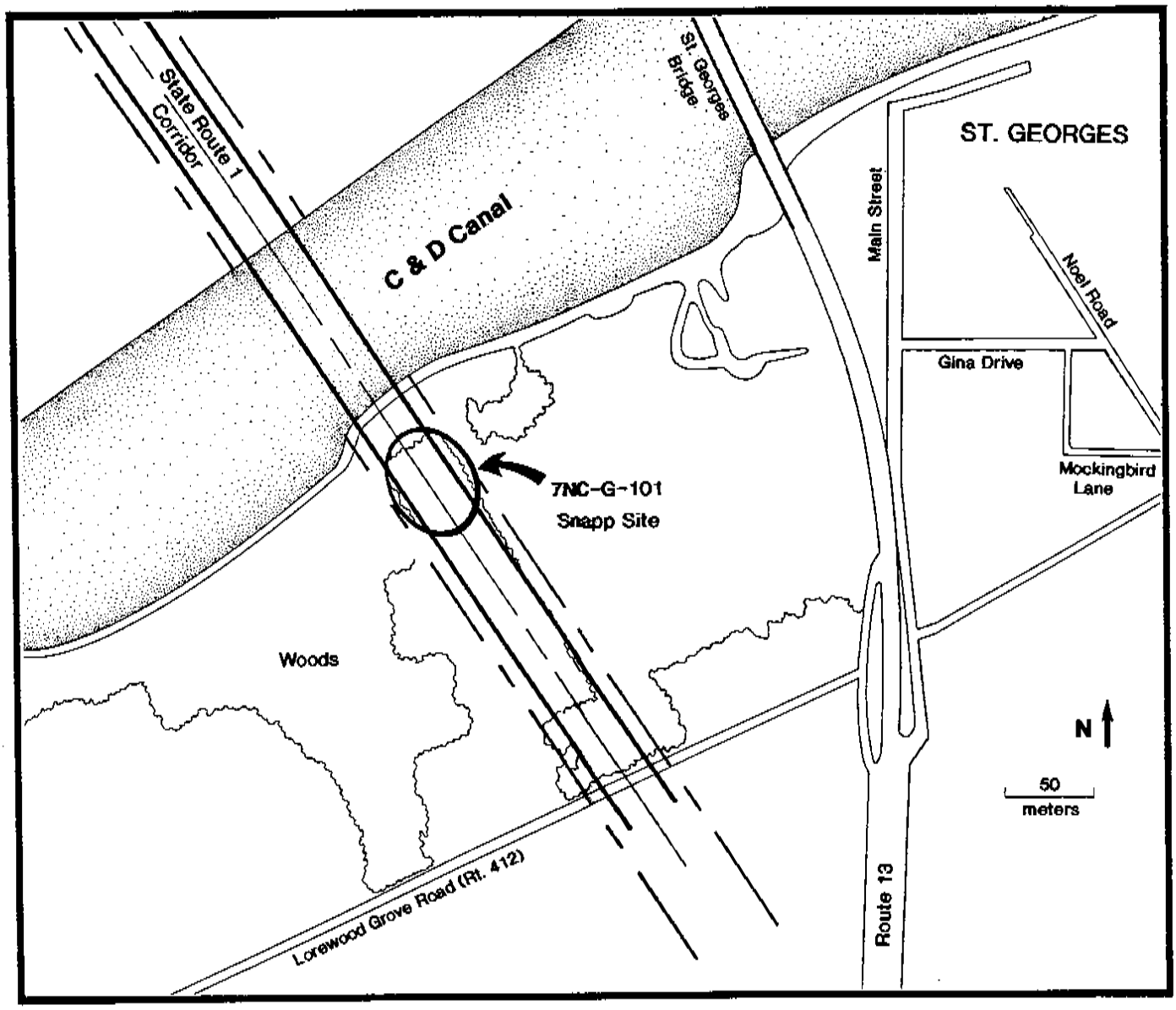
For the reasons listed above, the Wrangle Hill South site was recommended for further research, as it may be eligible for Nomination to the National Register of Historic Places under Criterion D. It is likely that the site will yield important information on the cultural history of the region, the distribution of Nassawango wares, and new information on Woodland I and Delmarva Adena lifeways in northern Delaware.

Snapp Prehistoric Site

The Snapp Prehistoric site, 7NC-G-101, was identified during pedestrian survey of a plowed field immediately south of the C&D Canal (Figure 21). Over 200 fire-cracked rock fragments were observed, and one quartz early-stage biface reject, one chert core, one hammerstone, and one ground stone tool fragment were collected (Hodny, Bachman, and Custer 1989:46-48,98). Concentrations of the fire-cracked rock were observed in two areas separated by an ephemeral drainage across an area approximately 120x100 m. Although a time of occupation could not be assigned to the site, the large volume of fire-cracked rock suggested an intensive occupation.

The site is on a relatively flat terrace west and northwest of a small knoll. The occupation area is bounded by steep slopes above an intermittent stream and ephemeral drainages on the west and on the east. To the north of the site are three terraces, that may be natural terraces of St. Georges Creek, which was incorporated into the C&D Canal. The steep slopes and floodplains of the streams adjacent to the site are forested. The irregular topography of the cultivated field suggests only minor soil deflation and erosion.

FIGURE 21
Location and Setting of the Snapp Prehistoric Site (7NC-G-101)



Phase II testing of the site conducted in 1991 consisted of 193 shovel test pits and 86 1x1 m test units (Figure 22). Twenty-three 1x1 m units were placed where shovel test pits had previously been excavated. Diagnostic artifacts of the Woodland I time period recovered are six stemmed and notched projectile points made of chert, argillite, and jasper. Other artifacts recovered include early and late-stage bifaces, flake tools, utilized flakes, debitage, and large amounts of fire-cracked rocks (Table 8). Fourteen features, or potential features, were also identified during Phase II testing (Figure 22). Three of the features were excavated, and they appeared to be prehistoric storage or refuse pits. One of the features produced a single sherd of

FIGURE 22

Snapp Site (7NC-G-101) Phase II Testing

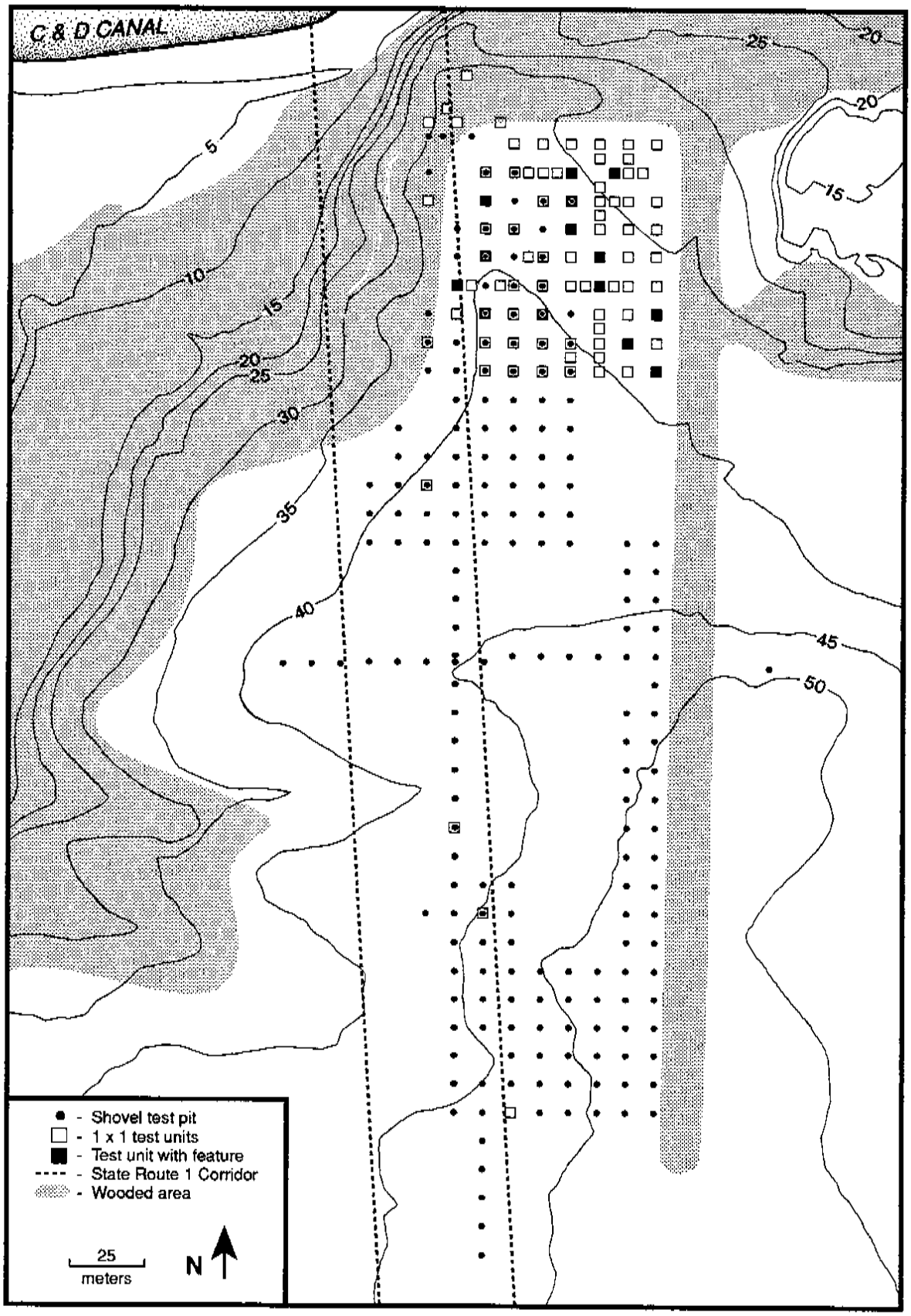


TABLE 8

Snapp Site (7NC-G-101)

Total Prehistoric Artifact Counts

	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Chalcedony	Other	Total
Flakes	25(5)	74(9)	494(73)	311(62)	4	19	1	108(14)	4	1040(163)
Utilized flakes	1	2	3	10(2)	--	--	--	--	--	16(2)
Flake tools	--	--	1	1(1)	--	--	--	--	--	2(1)
Woodland I points	--	--	2	1	--	2	--	--	1	6
Woodland II points	--	--	1	--	--	--	--	--	--	1
Early stage biface reject	--	--	2	2(1)	--	--	--	--	--	4(1)
Late stage biface reject	--	--	1	--	--	--	--	--	--	1
Other bifaces	--	2	--	2	--	--	--	2	1	7
Shatter	2(1)	9(2)	--	--	--	--	--	--	--	11(3)
Cores	--	2(1)	1(1)	1	--	--	--	--	--	4(2)
Totals	28(6)	89(12)	505(74)	328(66)	4	21	1	110(14)	6	1092(172)

(#) = # with cortex Fire-cracked rock (count/ weight) : 1122/ 59.87 kg

Selden Island ceramics (1000 - 700 B.C.; Custer 1989:176), and another contained an argillite contracting-stem point. Other bifaces and debitage were also recovered from the features. Most of the artifacts recovered from the site were found in either the plow zone or in features, but some areas of intact, artifact bearing sediments were located in the wooded areas to the north and west of the site.

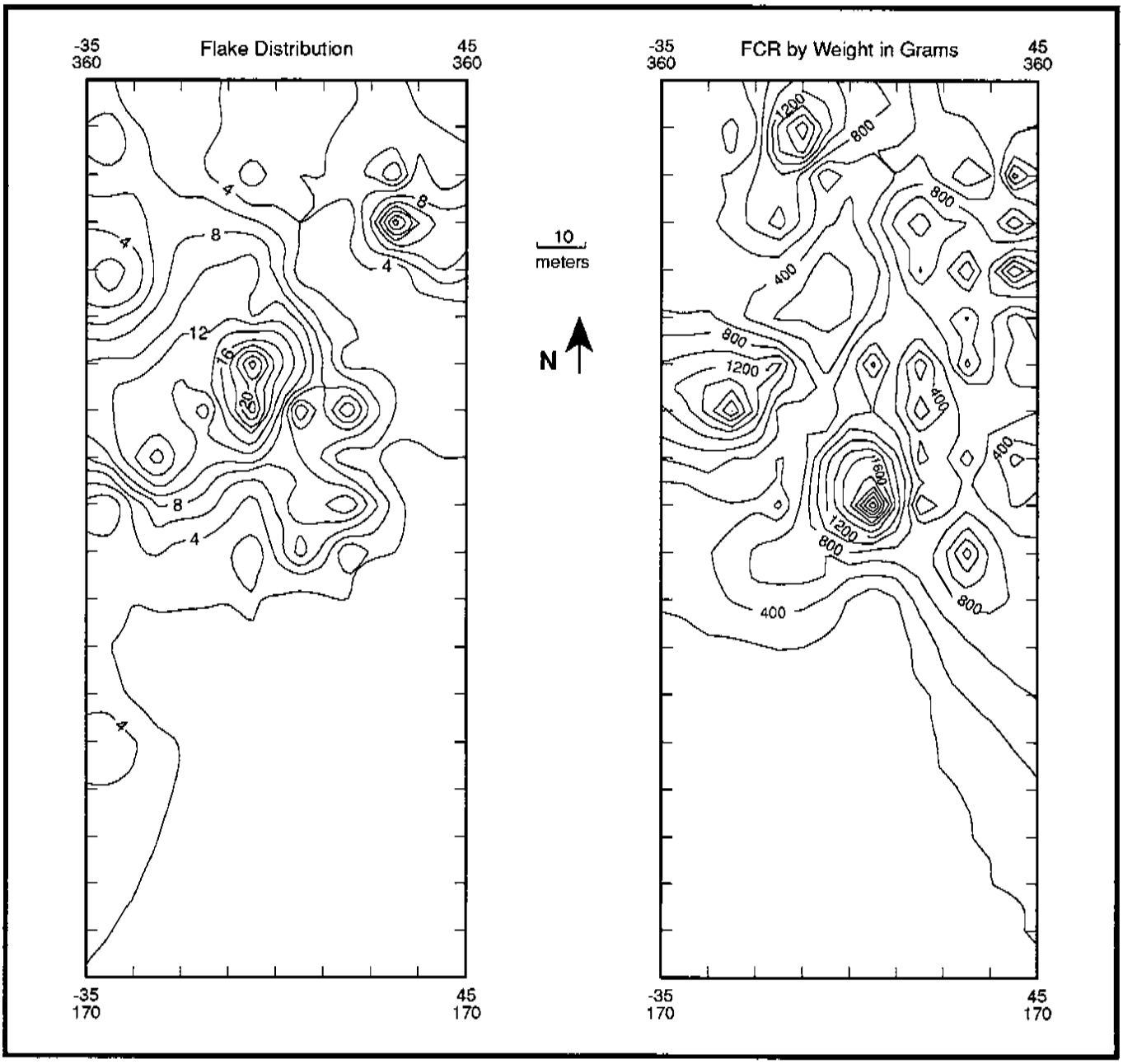
A total of 1,040 flakes of debitage were recovered (Figure 23). Chert was the most common raw material type (47.5% of the debitage, Table 8). Jasper was also common (29.9%). Chalcedony, quartz, and quartzite were used in lesser amounts (Table 8), and less than 0.1 percent of the flakes were ironstone (one flake). Tools were made of a variety of materials including all of the lithic materials represented by flakes except rhyolite and ironstone. Fire-cracked rock was abundant on the site amounting to almost 60 kg (Figure 23).

Site 7NC-G-101 has been tentatively identified as a macro-band base camp from the Clyde Farm Complex of the Woodland I Period. A number of macro-band base camps from this time period have been identified in Delaware (Custer 1984:93-112; 1989:193-221), but few of these sites have contained intact pit features. Prior studies of the early Woodland I Period have suggested that it was a time of pronounced change in many aspects of prehistoric lifeways, such as settlement patterns, subsistence activities, social organization, population growth, tool kits, and trade and exchange networks (Custer 1984, 1989).

FIGURE 23

Snapp Site (7NC-G-101)

Debitage and Fire-Cracked Rock Distributions



The Snapp prehistoric archaeological site is a significant cultural resource for several reasons. The site has produced a wide range of artifacts from the early Woodland I Period, some of which are from intact, unplowed soils. The site also contains pit features from the Woodland I time period that are likely to yield important information on prehistoric subsistence.

The presence of pit features at the Snapp site affords the possibility of recovering prehistoric food remains and other ecofacts that allow the study of subsistence patterns and resource availability. Information on the prehistoric environments surrounding the site and season of site occupation may also be obtained from floral and faunal material recovered from the features.

The presence of a wide range of stone tool types at the site suggests a variety of activities. The tools may be compared to those from both earlier and later sites in the area to better understand the changes in prehistoric tool kits. Analysis of the raw materials present would provide information on lithic procurement and tool manufacturing techniques. Non-local lithic raw materials, such as rhyolite and argillite, are present at the site, and may provide information on trade and exchange networks during the Woodland I Period. Recent research (Watson and Custer 1990) at Woodland I sites in Delaware and New Jersey suggests that people may have had larger wandering ranges, and may not have been as sedentary as previously thought. One reflection of this greater mobility involves the procurement of argillite. Although it is not present in great quantities at the Snapp site, its use there, coupled with information on the season(s) of occupation, may allow a better understanding of prehistoric settlement patterns.

The presence of intact, artifact-bearing soils presents the opportunity to identify undisturbed activity areas and living floors. Although the unplowed soils are limited in area, the magnitude of agricultural and construction activities in northern Delaware makes them a valuable resource. In sum, the Snapp prehistoric site is eligible to the National Register because it has the potential to yield significant data on a variety of research topics concerning the adaptations and lifeways of Woodland I people.

Woodville Farm Historical Site

The Woodville Farm site (7NC-E-98), referred to as the Smith site in the Phase I research report (Hodny, Bachman, and Custer 1989:74-79), is located in Red Lion Hundred approximately two miles north of St. Georges, east of present Route 13 (Figure 24). The site was recorded in 1979 by the Delaware Bureau of Archaeology and Historic Preservation as CRS No. N-5053 prior to the archaeological survey of the State Route 1 Corridor. Shortly afterwards, the house was demolished. The Phase I survey in June 1988 found the remains of the frame dwelling with two brick chimneys and a stone foundation in a thickly overgrown, fallow field and woodlot. Large trees marking old property lines around the house site were located as well. Shovel test pits excavated in the area contained whiteware, redware, stoneware, bottle and window glass, brick, nails and other post-1840 artifacts and debris (Hodny, Bachman, and Custer, 1989:73-79) .

The site appears on nineteenth-century historical maps, including Rea and Price (1849), Beers (1868; see Figure 25), Hopkins (1881), and Baist (1893) as an owner-occupied farm,

FIGURE 24

Location of the Woodville Farm Site (7NC-E-98)

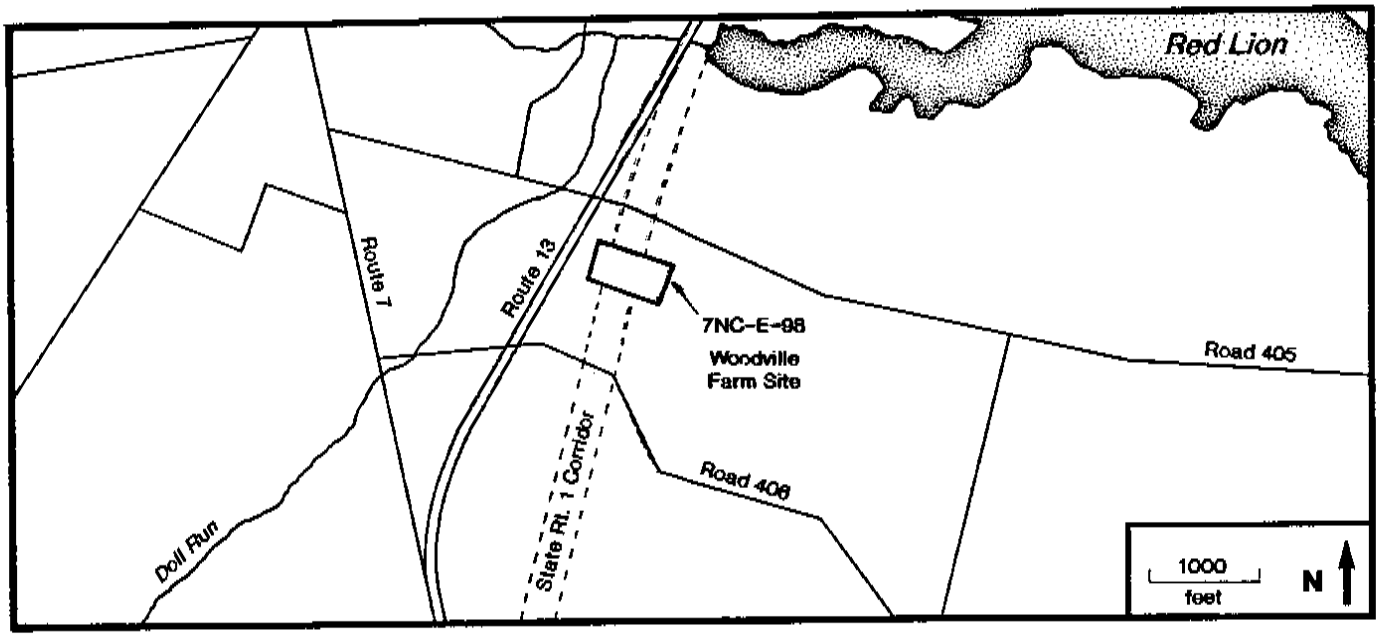
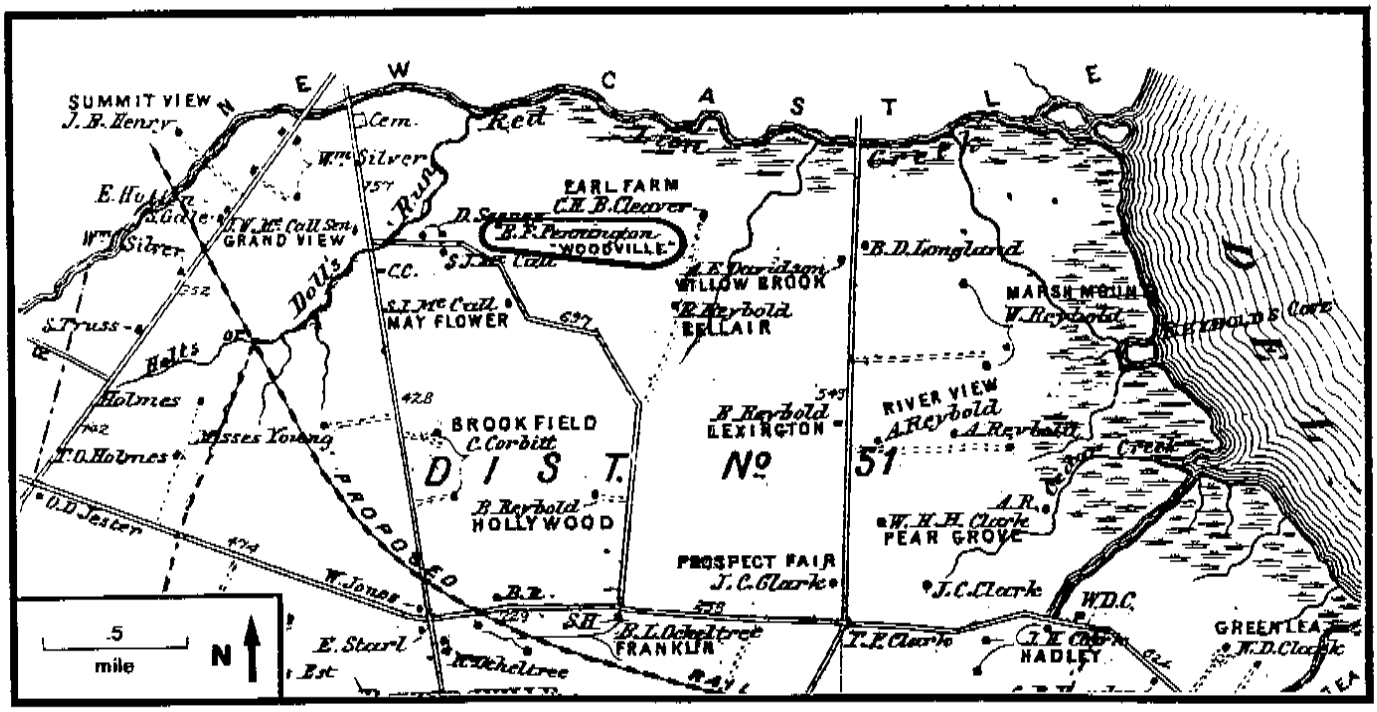


FIGURE 25

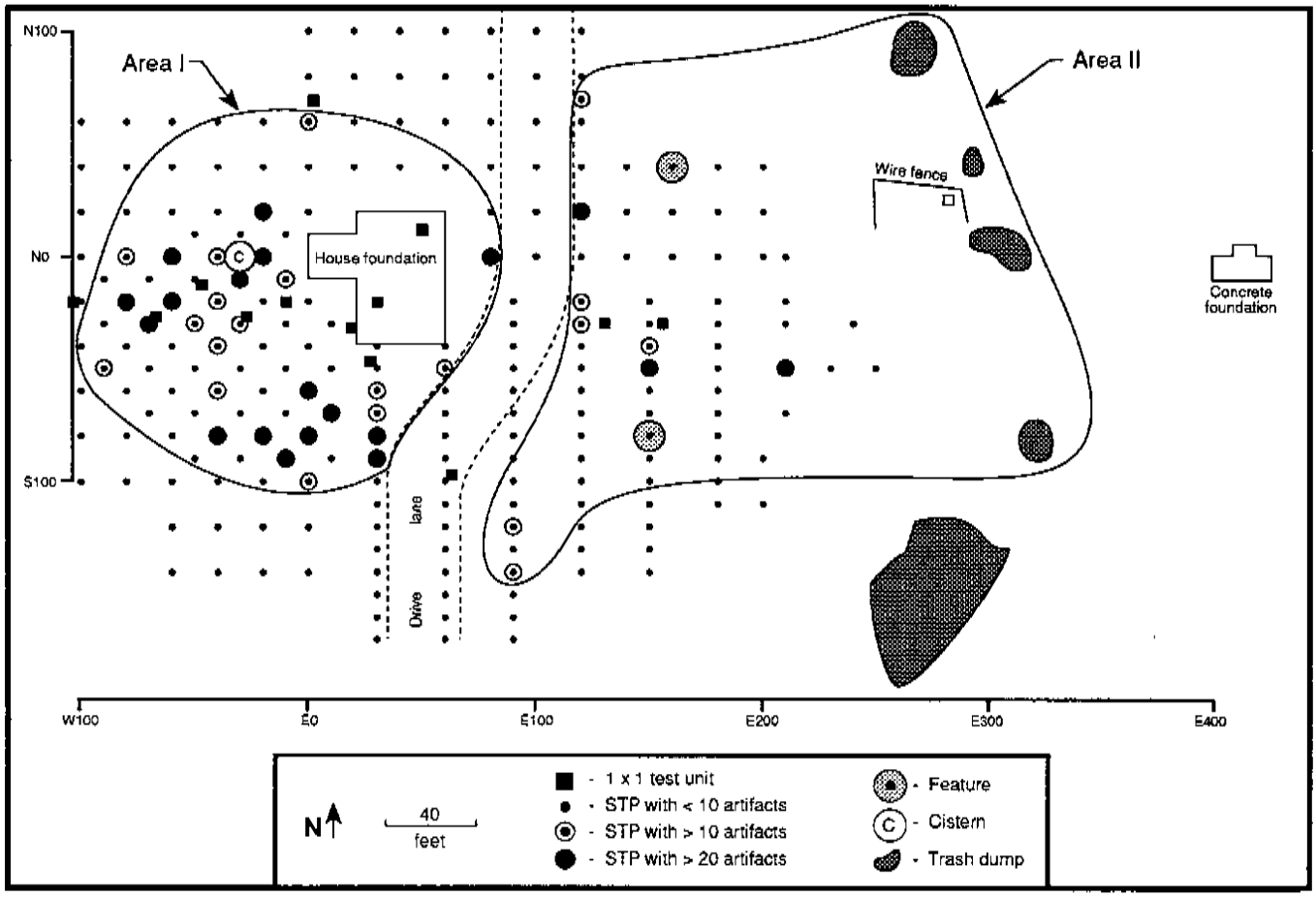
Detail of Beers' 1868 Atlas of New Castle County, St. Georges Hundred



The "Woodville" Farm Site (7NC-E-98) is shown in the possession of B.F. Pennington off Road 697 in St. Georges Hundred. Red Lion Creek is the southern boundary of New Castle Hundred.

FIGURE 26

Results of Testing at Woodville Farm Site (7NC-G-98)



designated "Woodville" on Beers' atlas. Phase II excavations were undertaken at the site in order to locate and assess cultural features associated with the house and farm.

Phase II testing consisted of excavation of 225 shovel tests and thirteen 3x3 ft squares. The excavations were aligned on a 20-ft grid oriented to the extant dwelling. Two areas of cultural remains or activities, Areas I and II, were identified (Figure 26). Area I, the core of the site and the primary locus of domestic activity, contained an artifact density of between 10 and 30 artifacts per shovel test. Area II was lower in artifact density (between 5 and 20 artifacts per shovel test) and lay east of Area I.

Diagnostic mid-to-late nineteenth and early twentieth-century artifacts were recovered from undisturbed contexts in the excavations to a depth of 3.0 ft below ground surface. A plow zone, approximately 1-ft thick, extended across part of the site. In addition to the remains of the house, 16 historical archaeological features were identified. These buried features included the

remains of a large (80x40 ft) barn east of the house foundation, several nineteenth and twentieth-century trash pits, a builder's trench associated with the house, a large cistern, and a wire fence.

Diagnostic mid-to-late nineteenth century and twentieth-century artifacts were recovered from intact subsoil contexts in both Areas I and II. Mid-to-late nineteenth-century annular pearlwares, transfer-printed whitewares, white granite wares, yellowwares, and coarse redwares were the most common ceramic artifacts found. The ceramic types are consistent with the known occupation of the site. Window glass, coal, cut and wire nails, molded bottle and Mason jar fragments, and brick fragments were also recovered (Table 9).

Historical documents indicate that the Woodville Farm site was a substantial farm owned by a succession of local families from ca. 1810 until the 1970s (Table 10). The farm first appears in a 1816 tax list for Red Lion Hundred. In that year, the Woodville Farm site consisted of 123 acres of land with a small dwelling and stable. Eighty acres of the farm had been cleared and improved and the remainder of the farm was woodland and swamp. The occupant of the site is uncertain. No tenant is listed, but the owner, Reverend Purnel Veach, was a minister in Christiana. Veach purchased the property from the heirs of Patrick Porter in two separate transactions in 1807 and 1809. Both of the deeds describe Reverend Veach as a resident of Red Lion Hundred suggesting that he may have commuted to Christiana for church services. Tax assessments taken in 1822 and 1828 give similar descriptions of the farm as in 1816, but do not list any tenants either. It seems likely that Reverend Veach did live on his farm.

Reverend Veach died intestate in 1829 and the New Castle County Orphan's Court awarded the property to his eldest son, William P. Veach. The first documentary evidence of the structure itself is the 1829 Orphan's court plat of the land. The Woodville Farm site is shown on a 142-acre parcel.

William Veach owned the land for less than three years when he sold it, in 1832, to John L. Shuster. William Veach probably operated his father's farm as a tenancy because the 1832 deed notes that he lived in New Castle Hundred at the time of the sale. John L. Shuster, however, clearly occupied the farm as owner until 1837 when John H. Fromberger bought the 142 acre farm and another 200 acres of nearby marsh. Fromberger lived in Wilmington when he purchased the property, but apparently moved to occupy the farm because he is listed as a resident of Red Lion Hundred when he sold the land later in 1837.

Ashbury L. Pennington of New Castle Hundred bought the property from Fromberger. Pennington is shown at the site on Rea and Price's 1849 map of New Castle County. When Ashbury Pennington died ca. 1868, the land was sold to his son, Benjamin F. Pennington. Ashbury Pennington apparently made substantial improvements to the property because when the land sold to Benjamin, the value of the farm had more than tripled from $2800 in 1837 to $10,000 in 1868.

The name "Woodville" first appears on Beers' 1868 atlas under ownership of the Penningtons. Named tracts are typically owner-occupied in central and northern Delaware.

TABLE 9

Summary of Woodville Farm Site (7NC-E-98) Artifacts

Glass	Area 1	Area 2	Outside	Totals
Bottle	203	52	63	318
Jar	12	0	13	25
Window	201	165	19	385
Table	16	2	1	19
Lamp	42	11	4	57
Milk	4	1	1	6
Mirror	6	0	0	6
Decorated	1	0	0	1
Other	6	2	0	8
Unidentifiable	216	40	18	274
Totals	707	273	119	1099
Metal	**Area 1**	**Area 2**	**Outside**	**Totals**
Wrought nails	18	0	0	18
Cut nails	337	14	16	367
Wire nails	260	23	21	304
Unidentified nails	404	29	61	494
Bolts	4	2	0	6
Staples	1	3	0	4
Screws	17	0	8	25
Slag	34	0	38	72
Ammunition	4	1	1	6
Tools	1	0	0	1
Coins	1	2	0	3
Tableware	2	0	0	2
Household utensils	6	1	0	7
Other	218	10	31	259
Unidentifiable	373	70	81	524
Totals	1680	155	258	2093
Ceramics	**Area 1**	**Area 2**	**Outside**	**Totals**
Smoking Pipes	1	0	1	2
Redware	181	4	34	219
Creamware	5	2	0	7
Pearlware	28	0	3	31
Whiteware	197	4	53	254
White granite	25	0	18	43
Yellowware	14	0	0	14
Salt-glazed stoneware	15	2	6	23
Tin-glazed	0	0	1	1
Porcelin	14	1	1	16
Drainpipe	4	0	4	8
Drain tile	4	1	0	5
Unidentifiable	3	1	0	4
Totals	491	15	121	627
Miscellaneous	**Area 1**	**Area 2**	**Outside**	**Totals**
Brick (grams)	7932	58	3150	11140
Glazed brick (grams)	500	0	2	502
Coal (count)	89	3	13	105
Coal (grams)	338	33	264	635
Coal ash (grams)	50	2	2	54
Mortar	56	66	4	126
Plaster	72	26	1	99
Other stone	17	2	0	19
Plastic	118	15	15	148
Buttons	2	0	4	6
Wood	5	1	0	6
Toys	3	0	0	3
Shell (count)	6	0	6	12
Shell (grams)	286	0	3	289
Bone	50	1	8	59
Other	21	2	13	36
Totals (count)	439	116	64	619
Totals (grams)	9106	93	3421	12620

Area 1 = Core area of site around the house
Area 2 = Area around the barn across drive from house
Outside = Excavations outside the above areas (see Figure 29)

Naming farms suggests the pride that farmers took in such highly-improved, successful farms. In 1852, Ashbury Pennington's farm was valued at $8,935 making it one of the wealthier farms in the area. In that year, Pennington's farm consisted of 142 acres of land with frame buildings. Nearly all of the parcel (125 acres) was cleared and improved. The remaining acres were swamp along Red Lion Creek.

Benjamin F. Pennington sold Woodville in 1873 to William Bright of Wilmington after defaulting on a mortgage held by Bright. Bright was a real estate broker who was director of the Farmer's Bank of Wilmington. He was president of the Wilmington City Council in 1867, and was nominated as a candidate for state governor in 1874 (Scharf 1888:809-810). Pennington had tried to sell in 1872 to Daniel Bratton of Cecil County, Maryland. Bright, however, sued Pennington over the land and the Superior Court of Delaware ordered the sheriff Robert Armstrong to seize the land in May 1873. Prior to the sheriff's sale, Pennington was living on the property with his family and one tenant, Abraham C. Wright. William Bright sold the farm in 1874 to James Gray of nearby St. Georges Hundred. Bright, who lived in Wilmington, probably rented the farm to a tenant.

James Gray clearly owned and occupied Woodville because his name appears at the site on Hopkins' 1881 and Baist's 1893 atlases. The size of the farm remained stable at 142 acres. Gray purchased the farm for $10,000, the same price paid by Benjamin F. Pennington eight years earlier in 1868. The site was then inhabited by a succession of owners and tenants until early 1980 when the house and outbuildings collapsed from vandalism and neglect.

Based on previous historical and archaeological research, the Woodville Farm site (7NC-E-98) is considered to be eligible for nomination to the National Register of Historic Places. The site has yielded, and is likely to yield, further information on the domestic economy, agriculture, and settlement patterns of southern New Castle County and the surrounding region. Phase II testing of the site found that artifacts and structural remains are intact and the potential for additional features is high.

Further investigations at the Woodville Farm site could address the history of agricultural improvement and decline in the Upper Delmarva Peninsula for the period of early industrialization (1770-1830), the period of industrialization and capitalization (1830-1880), and the period of urbanization and industrialization (1880-1940), as defined by Ames, Herman, and Siders (1989). The Woodville Farm site was affected by the processes of site formation and utilization operating under these historical trends. The data from the site are relevant to current historical and archaeological perspectives on these periods and processes.

Under the temporal contexts defined for historical archaeological sites in Delaware (Ames, Herman, and Siders 1989), Domestic Economy includes all of the historical and economic contexts discussed above (De Cunzo and Catts 1990:16-19, 131-133). Research into the Domestic Economy for the periods 1830-1880 and 1880-1940 in the Upper Peninsula could focus on three interrelated topics at the intra-site and inter-site levels of investigation: architecture and land use, foodways,

TABLE 10

Partial Chain of Title for the Woodville Farm Site (7NC-E-98)

Transactions	Acres	Date	References
From Evan and Mary Rice to Purnel Veach 1/3 right	142	1 July 1809	H-3-544
From Archibald and Mary Alexander to Purnel Veach 2/3 right	142	28 December 1807	V-3-345
From William P. Veach to John L. Shuster	142	20 November 1832	P-4-488
From Purnel Veach to son William P. Veach	142	21 April 1829	N-1-263
From John L. Shuster to John H. Fromberger	142	7 February 1837	X-4-254
From John H. Fromberger to Ashbury L. Pennington	142	14 April 1838	A-5-284
From Ashbury L. Pennington to sons Louis, Albert, and Benjamin Pennington	142	----------	R-8-131
From Albert R. and Louis E. Pennington to Benjamin F. Pennington	142	11 April 1868	R-8-131
From Sheriff Robert L. Armstrong (for B.F. Pennington) to William Bright	142	16 October 1873	C-10-469
From William Bright to James Gray	142	20 March 1874	O-16-469

References are to New Castle County deed numbers. The Purnel Veach to son William Veach transaction is recorded in the Orphan's Court records.

and self-sufficiency and market participation. The owner-occupations of the site could be compared to comtemporary tenant-occupations at other sites in the area. Such comparisons could be used to identify specific owner vs. tenant patterns in site layout and spatial utilization, foodways, and trash disposal patterns.

On an intra-site level, investigations at the Woodville Farm site can examine changes over both time and space in internal site layout, the social status of the tenant- and owner-occupants, and the effects of changing consumer choices and dietary patterns on those occupants as reflected in the archaeological record. For example, the precise identity and socio-economic status of the

tenants of the site are not known. Were the lives of the tenants substantially different than those of subsequent owners? What is the relationship between changes in the local and regional economy and the various tenant and owner occupations? Did tenants, because they did not own the land, utilize and maintain the property in the same way as the later owners who named the farm and carefully improved it? These questions may be answerable through historical documentation, including probate records, tax lists, and census records, as well as through the archaeological remains. Moreover, data concerning dietary patterns, spatial patterns, and artifact classes are present at the site. These patterns can be examined as reflections of the social status and lifeways of the site's inhabitants over time.

The archaeological context of Domestic Economy is also relevant on a local and regional level, including the larger historical context of agriculture (Ames, Herman, and Siders 1989). Through artifact analysis and historical research the Woodville Farm site can be compared to several other local archaeological sites. Specifically, the Woodville Farm site could be compared to a number of lower socio-economic status tenant archaeological sites recently investigated in Dover and Little Creek hundreds (Grettler, Bachman, and Custer 1991, Grettler et al. 1991), particularly, the W. Eager House site (7K-C-383) and the Wilson-Lewis site (7K-C-375). Data on the tenant occupation of the Woodville Farm site could also be compared to similar data from owner-occupied sites in Kent County, particularly the Moore-Taylor site (7K-C-380) and the Buchanan-Savin Farm (7NC-J-175) (Grettler, Bachman, and Custer 1991). Other sites which can be compared include several domestic occupations from the nineteenth and twentieth centuries located throughout the state (Catts and Custer 1990; Catts, Hodny, and Custer 1989; Coleman et al. 1983; Hoseth et al. 1990; and Heite and Heite 1985). Such comparative studies offer the potential for significant information on site layout, social status, ethnicity, and consumerism.

DISCUSSION AND CONCLUSIONS

SUMMARY

Phase II excavations at nine sites have clarified their potential for nomination to the National Register of Historic Places. The findings are summarized in Table 11. Four small prehistoric sites, Conrail South A, Conrail South B, Weaver, and Dragon Run North A (7NC-E-92, 7NC-E-93, 7NC-G-102, and 7NC-G-103), are not significant. Two larger prehistoric sites, Parkway Gravel and Dragon Run North B (7NC-G-100 and 7NC-G-104), yielded much more cultural material and also important information, but were not deemed eligible for the National Register because of the poorly-preserved contexts. Two prehistoric sites, Wrangle Hill South and Snapp (7NC-G-101 and 7NC-G-105), and one historical site, Woodville Farm (7NC-E-98), yielded evidence of intact features and important cultural information. The sites are eligible for nomination to the National Register of Historic Places and further research is recommended. Preservation of these three eligible sites is the preferred mitigation alternative. However, if this

TABLE 11

Summary of Research Recommendations

Site Number	C.R.S. Number	Site Name
No further research required		
7-NC-93	N-12119	Conrail South A Prehistoric site
7NC-E-92	N-12118	Conrail South B Prehistoric site
7NC-G-103	N-12125	Dragon Run North A Prehistoric site
7NC-G-102	N-12124	Weaver Prehistoric site
7NC-G-100	N-12116	Parkway Gravel Prehistoric site
7NC-G-104	N-12126	Dragon Run North B Prehistoric site
Further research recommended		
7NC-G-105	N-12127	Wrangle Hill South Prehistoric site
7NC-G-101	N-12117	Snapp Prehistoric site
7NC-E-98	N-5053	Woodville Farm Historical site

alternative is not possible, minimal impact with data recovery of the impacted portions of the sites is recommended. If any of these three eligible sites are to be completely impacted, then complete recovery of the impacted site is recommended.

SMALL PROCUREMENT SITES IN NORTHERN DELAWARE

Phase II investigations of four small prehistoric sites, Conrail South A, Conrail South B, Weaver, and Dragon Run North A (7NC-E-92, 7NC-E-93, 7NC-G-102, and 7NC-G-103), produced no more information on the occupations of the sites than had Phase I investigations (Hodny, Bachman, and Custer 1989). Further research is not necessary for these sites. Despite the lack of cultural material recovered at the four sites, locations of the sites provide information on prehistoric life. The sites are low density, artifact scatters that probably represent hunting and gathering procurement sites occupied during short forays away from larger base camps (Custer

1984:104-105). Sites like these four are very common in the region; therefore, they represent a significant part of the settlement pattern and adaptive strategy of the Woodland I time period (Custer 1988:35; see also Sullivan 1992 and Tainter 1979 on the significance of small sites).

For the Chesapeake and Delaware Canal section of the State Route 1 Corridor discussed here, approximately 194 acres were surveyed and nine small sites were discovered (Hodny, Bachman, and Custer 1989). The average density of procurement sites is then one site per 21.6 acres (194 acres/9 sites). All four of the sites discussed in this report are situated on higher ground adjacent to ephemeral or intermittent drainages on the edge of the Mid-drainage zone. The tops of low knolls were preferred.

The State Route 1 Corridor runs along a physiographic boundary that may have been a preferred habitat because of access to the resources of more than one environmental zone (Figure 27). However, the State Route 1 Chesapeake and Delaware Canal segment is a sample of less than 0.1 percent of New Castle County. Thus, the estimates above for the density of small, procurement sites may be grossly inaccurate. Custer (1988:41) calculated the density of small sites in the Piedmont of New Castle County at 30 sites per square kilometer. The figure given above for the State Route 1 Corridor converts to 11.4 sites per square kilometer. Thus, the density of small sites varies between the different physiographic and environmental zones of northern Delaware (Figure 3).

LARGER, HIGHER-DENSITY SITES

Both the Parkway Gravel (7NC-G-100) and Dragon Run North B (7NC-G-104) sites have been damaged by plowing and other activities. Further significant cultural information is unlikely to be preserved at the sites. Few subsurface prehistoric features were found at either site, and artifacts were not recovered from sediments below the plow zone. Research at each site did add to our knowledge of the prehistoric past, however. At the Parkway Gravel site, there may be evidence of a Contact Period aboriginal occupation, and at the Dragon Run North B site, ironstone use was unusual.

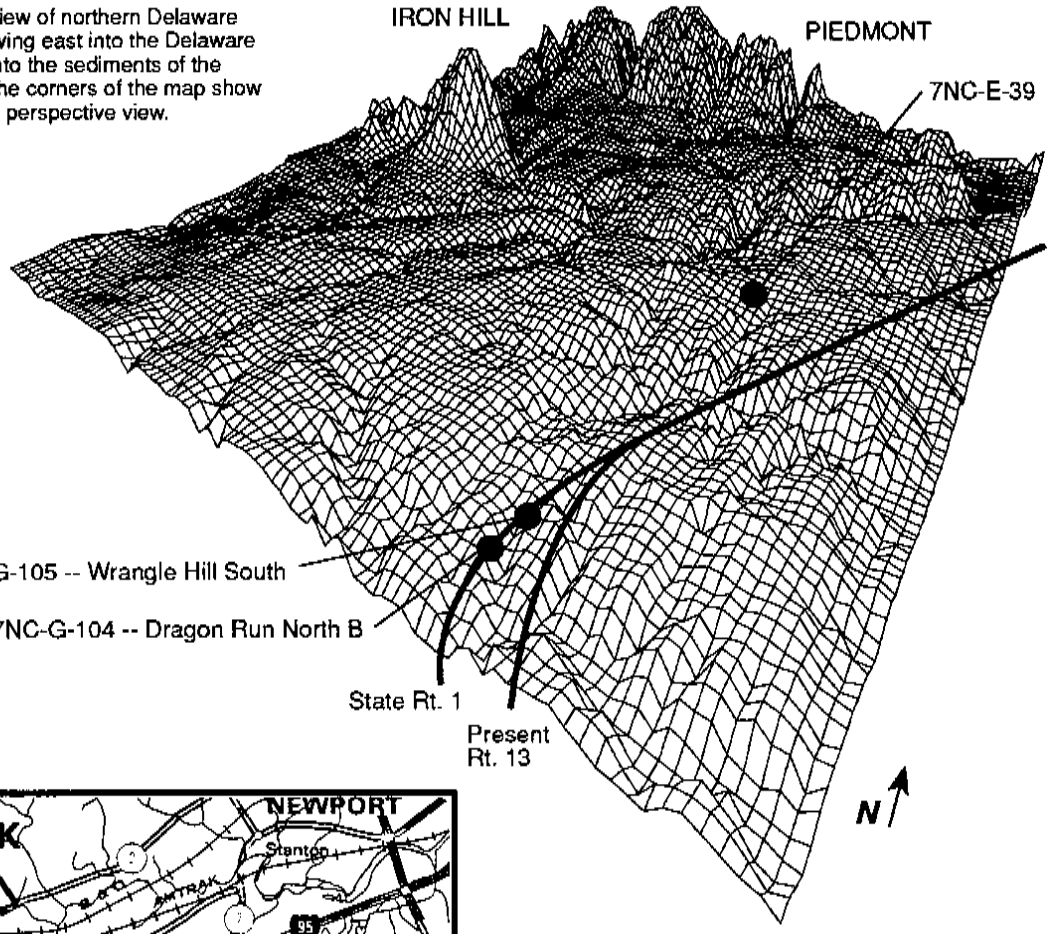
Contact Period Occupation in Northern Delaware

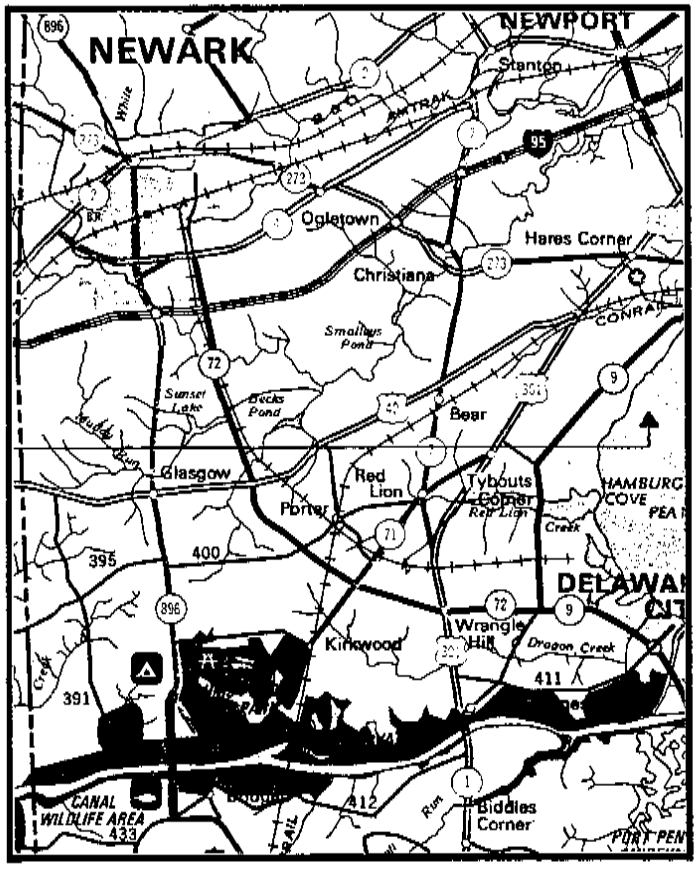
Archaeological evidence of the Contact Period in Delaware have been difficult to identify (Custer 1989:337; Fithian 1992). Documented contact between aboriginal peoples and Europeans in the Middle Atlantic region exists for the period 1600-1740 (Becker 1984). For example, the "Brandywine Band" of the Lenape was living on the Pennsylvania-Delaware border at the Big Bend of the Brandywine River until 1701, but no archaeological evidence was found there (Becker 1984). William Penn and his representatives purchased land from the Indians, as had the previous Swedish and Dutch colonists (Weslager 1987). In 1691, a payment was made to the Brandywine

FIGURE 27

Perspective View of Northern Delaware

This exaggerated view of northern Delaware shows how streams flowing east into the Delaware River have cut deeply into the sediments of the Upper Coastal Plain. The corners of the map show the area covered by the perspective view.





Band for all the lands between Duck Creek and Upland Creek. Penn allowed the Indians to stay on the land they occupied after such sales (Becker 1984). Payment for a purchase of 600 acres between Duck and St. Jones Creeks was three matchcoats, 12 bottles of drink, and four-double handfuls each of powder and shot (Hazard 1850). Thus, the Indians of northern Delaware had direct access to the types of items found at the Parkway Gravel site.

Another possible Contact Period site (7NC-E-42) in Delaware had Woodland II artifacts in association with some European material in an unplowed context (Custer and Watson 1985). Gunflints made of local raw materials are known from the Arrowhead Farm site in Kent County, Maryland and from Susquehannock sites in Pennsylvania (Custer 1989:338-339). According to Becker (1984), R. Thomas excavated a mid-eighteenth-century trash heap containing English flint worked into gunflints and Indian-style tools at the Morton Homestead site in Delaware County, Pennsylvania. No mention was made of any flaked glass at the site.

The Susquehannocks politically dominated the local Lenape Indian groups of Northern Delaware and virtually monopolized the fur trade (Custer 1989:340). Thus, the lack of European trade goods, such as beads or kaolin pipes, is not a basis for dismissing the presence of a Contact Period occupation at the Parkway Gravel site.

The possibility of late Contact Period Indian occupation of the Parkway Gravel site is somewhat speculative based on the meager evidence, but there is no documentary evidence for an early eighteenth-century European habitation of the site. If Indians occupied the site in the late seventeenth or early eighteenth century, they may have had access to some European goods, but only some European technology (e.g., guns). Thus, the type of assemblage found at the Parkway Gravel site may be typical of Contact Period Refuge Complex sites (Custer 1984:179). The location of the site a short distance away from a contemporaneous European settlement at St. Georges and along a transportation route might also be typical for Contact Period sites in Delaware. Even if the Parkway Gravel site finds are not definitive evidence of a Contact Period occupation, they nonetheless suggest some hypotheses for further testing. Much more information is necessary on the Contact Period.

Ironstone Use in Northern Delaware

The unusual amounts of ironstone debitage at both the Dragon Run North B and the Wrangle Hill South sites sparked a reevaluation of ironstone use in the region. Ward (1985) had documented the presence of a quarry site on the western side of the Delmarva Peninsula at Herring Island in the Elk River. Ward hypothesized that ironstone was traded in the region as biface preforms. Several archaeological projects have been undertaken in northern Delaware since Ward's (1985) M.A. thesis. Percentage of ironstone bifaces among all bifaces recovered at a site was calculated for 15 sites (Table 12). These data were combined with the data given in the

TABLE 12
Ironstone Biface Data for Figure 29

Site Number	UTM* Easting	UTM* Northing	Percent of All Bifaces made from Ironstone	Reference
7NC-A-017	439000	4402360	7.7	Custer and Hodny 1989
7NC-D-068	439820	4391770	0.0	Hoseth et al. 1990
7NC-D-075	442648	4393832	0.0	Bachman and Custer 1983
7NC-D-129	440090	4391930	0.0	Custer et al. 1988
7NC-E-009	443780	4390370	3.9	Custer et al. 1990
7NC-E-041	444688	4387184	0.0	Thomas 1981
7NC-E-043	443083	4394024	0.0	Bachman and Custer 1983
7NC-E-045	442960	4393952	0.0	Bachman and Custer 1983
7NC-E-050	444136	4389464	0.0	Catts et al. 1988
7NC-E-054	443120	4391440	0.0	Catts et al. 1988
7NC-E-081	445070	4385430	28.6	Catts et al. 1988
7NC-G-100	444160	4376440	10.0	This report
7NC-G-101	443980	4377750	0.0	This report
7NC-G-104	443260	4380250	37.5	This report
7NC-G-105	443190	4380750	20.0	This report

Data added to Update Ward (1985, Figure 13). Percentages calculated as in Ward (1985: 53; verified by personal communication July 1992).

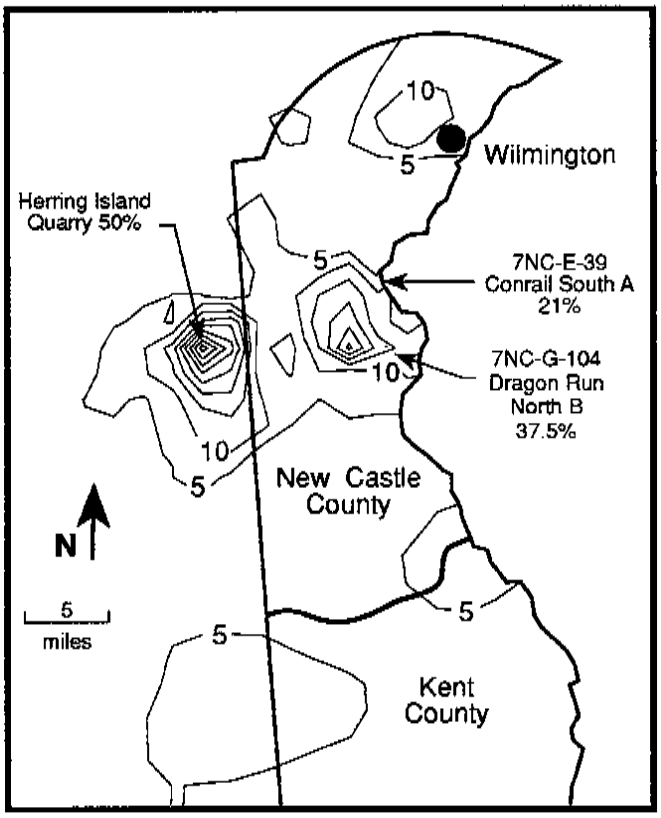
* Universal Transverse Mercator grid coordinates

Appendix of Ward (1985:119-128) and then re-contoured to update Ward's Figure 13 (1985:58; this figure is also shown in Custer 1989:237; see Appendix IV for a listing of all data). Figure 28 shows the results. The quarry site at Herring Island still shows a regional influence, however, a second possible source area is indicated by a peak in eastern Delaware centered on the Dragon Run North B site.

To further investigate the possibility of an ironstone source area in northern Delaware, the percentage of ironstone in excavated debitage assemblages was tabulated for 18 sites in northern Delaware (Table 13). Ward (1985) found that there was insufficient debitage data for the larger region, but focusing in on the smaller area of interest to this report, the available data are adequate for an initial assessment (Figure 29). The results suggest a center of ironstone use on the eastern margin of the Upper Coastal Plain below the Piedmont where ironstone occurs within the Columbia Formation of Pleistocene sands and gravels (Spoljaric 1971). Anecdotal information confirms that tabular ironstone outcrops occur near Hares Corner, Delaware. The high percentage of ironstone at the Dragon Run site, at a site just to the north (7NC-E-39; Ward 1985:125), as well as, at the Wrangle Hill South site suggests that high-quality ironstone was available locally.

FIGURE 28

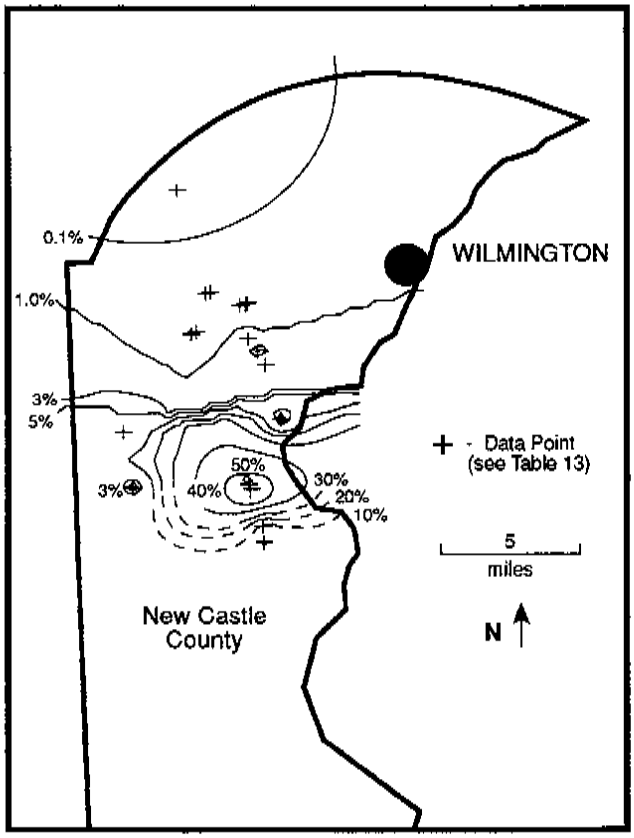
Percent of Ironstone Bifaces in Northern Delmarva Peninsula



An updated version of Figure 13 from Ward's (1985) masters thesis.

FIGURE 29

Ironstone Debitage in Northern Delaware



The availability of ironstone may be controlled by exposure of the raw material in deeply incised streams (see Figure 27) at the boundary between the Mid-drainage and Delaware Shore zones on the Upper Coastal Plain (Figure 3). This setting on the east side of the Delmarva Peninsula is analogous to the setting of the quarry at Herring Island on the west side of the Delmarva Peninsula where the Elk River has cut into the Upper Coastal Plain. This suggests the hypothesis that ironstone was used in the same manner as secondary cobble raw materials were on the Upper Coastal Plain — that is, wherever it was available (Custer and Galasso 1980). More data on the use of ironstone at sites on the upper Delmarva Peninsula could test this hypothesis.

The occurrence and use of ironstone locally on the east side of the Delmarva Peninsula does not disprove the hypothesis of Ward (1985) that ironstone may have been included in an exchange system that spread it down the Chesapeake Bay and the interior of the Delmarva Peninsula. Ironstone outcrops are still limited to a small area at the northern end of the bay and peninsula, and

TABLE 13

Ironstone Debitage Data for Figure 32

Percent Ironstone flakes in excavated debitage Collections from Northern Delaware

Site Number	UTM* Easting	UTM* Northing	Percent Ironstone Flakes	Reference
7NC-A-017	439000	4402360	0.34	Custer and Hodny 1989
7NC-D-054	440660	4394720	0.00	Custer et al. 1981
7NC-D-062	440920	4394850	0.00	Custer et al. 1981
7NC-D-068	439820	4391770	0.00	Custer et al. 1981
7NC-D-075	442648	4393832	0.00	Bachman and Custer 1983
7NC-D-129	440090	4391930	0.00	Custer et al. 1988
7NC-D-130	436060	4384450	0.88	Lothrop, Custer and DeSantis 1987
7NC-E-009	443780	4390370	0.00	Custer et al. 1990
7NC-E-043	443083	4394024	0.00	Bachman and Custer 1983
7NC-E-045	442960	4393952	0.00	Bachman and Custer 1983
7NC-E-050	444136	4389464	1.59	Catts et al. 1988
7NC-E-054	443120	4391440	0.20	Catts et al. 1988
7NC-E-081	445070	4385430	0.00	Catts et al. 1988
7NC-F-061	436440	4380560	0.00	Lothrop, Custer and DeSantis 1987
7NC-G-100	444160	4376440	3.63	This report
7NC-G-101	443980	4377750	0.21	This report
7NC-G-104	443260	4380250	88.67	This report
7NC-G-105	443190	4380750	55.09	This report

*Universal Transverse Mercator grid coordinates

the basic model of Ward (1985:58) and Custer (1989:237) still holds. Ironstone preforms may have been distributed from the narrow zone of availability with two centers, one on the west and another on the east side of the peninsula.

The local quarrying and reduction of ironstone is supported by the amount of cortex on ironstone flakes at the Dragon Run North B site (Table 6) and the larger average size of flakes at Dragon Run in comparison to the Parkway Gravel site (Figure 30). If the debitage at Dragon Run came from the reduction of ironstone preforms obtained by trade, then less cortex and smaller flakes would be expected. However, the percentage of ironstone flakes with cortex at Dragon Run is comparable to the percentage of cobble cortex seen at sites, like Parkway Gravel, where locally available stream cobbles were being exploited. Thirty percent of the ironstone debitage sample observed by Ward (1985:63) had cortex. There is no ironstone biface reduction sequence, as

FIGURE 30

Comparison of Flake Sizes at Parkway Gravel and Dragon Run North B Sites

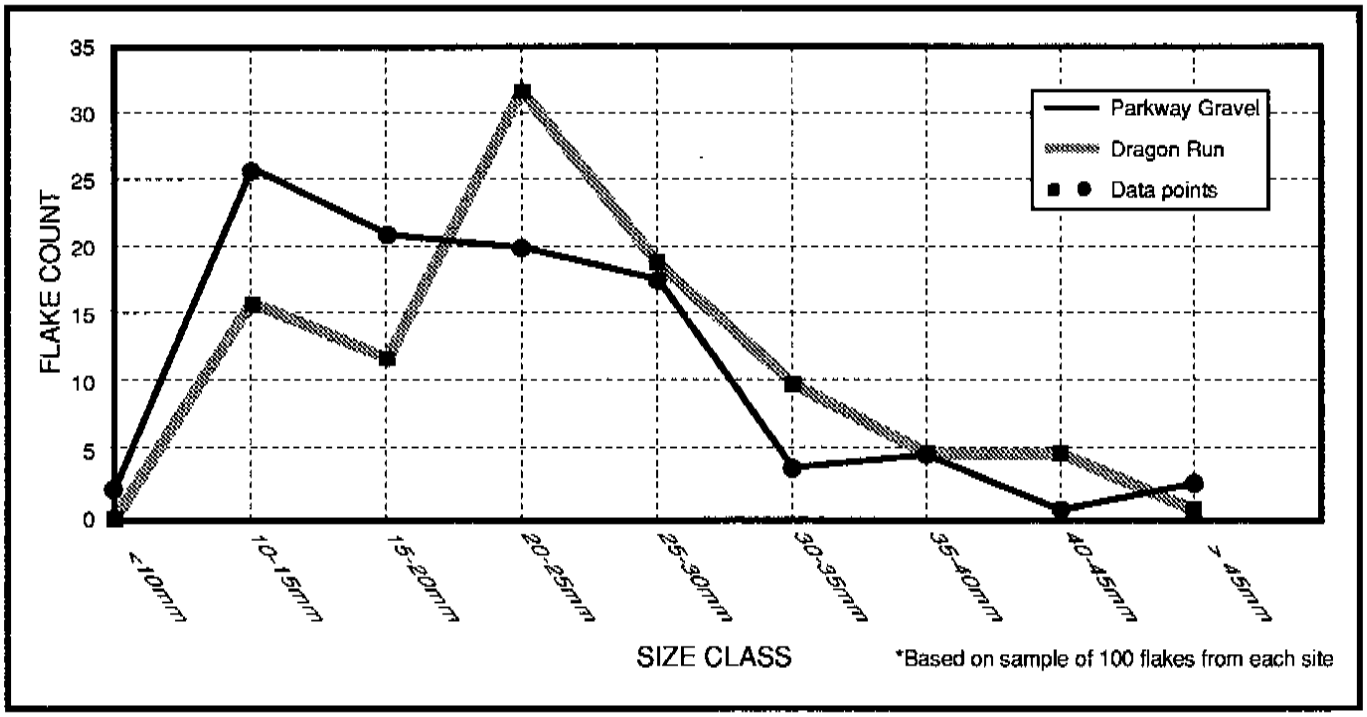


FIGURE 31

Ironstone vs. Cobble Flaking Model

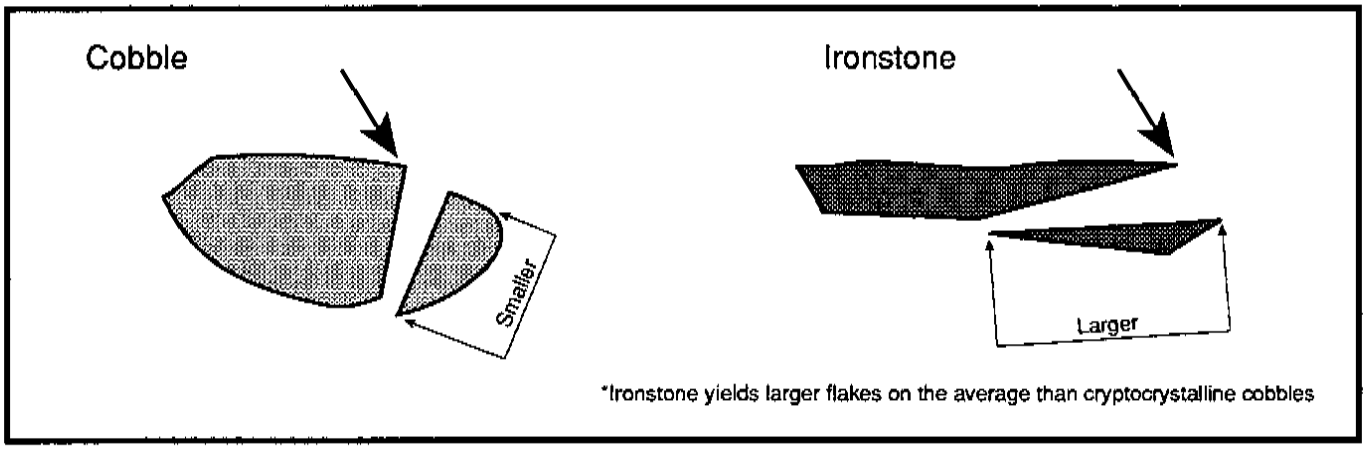
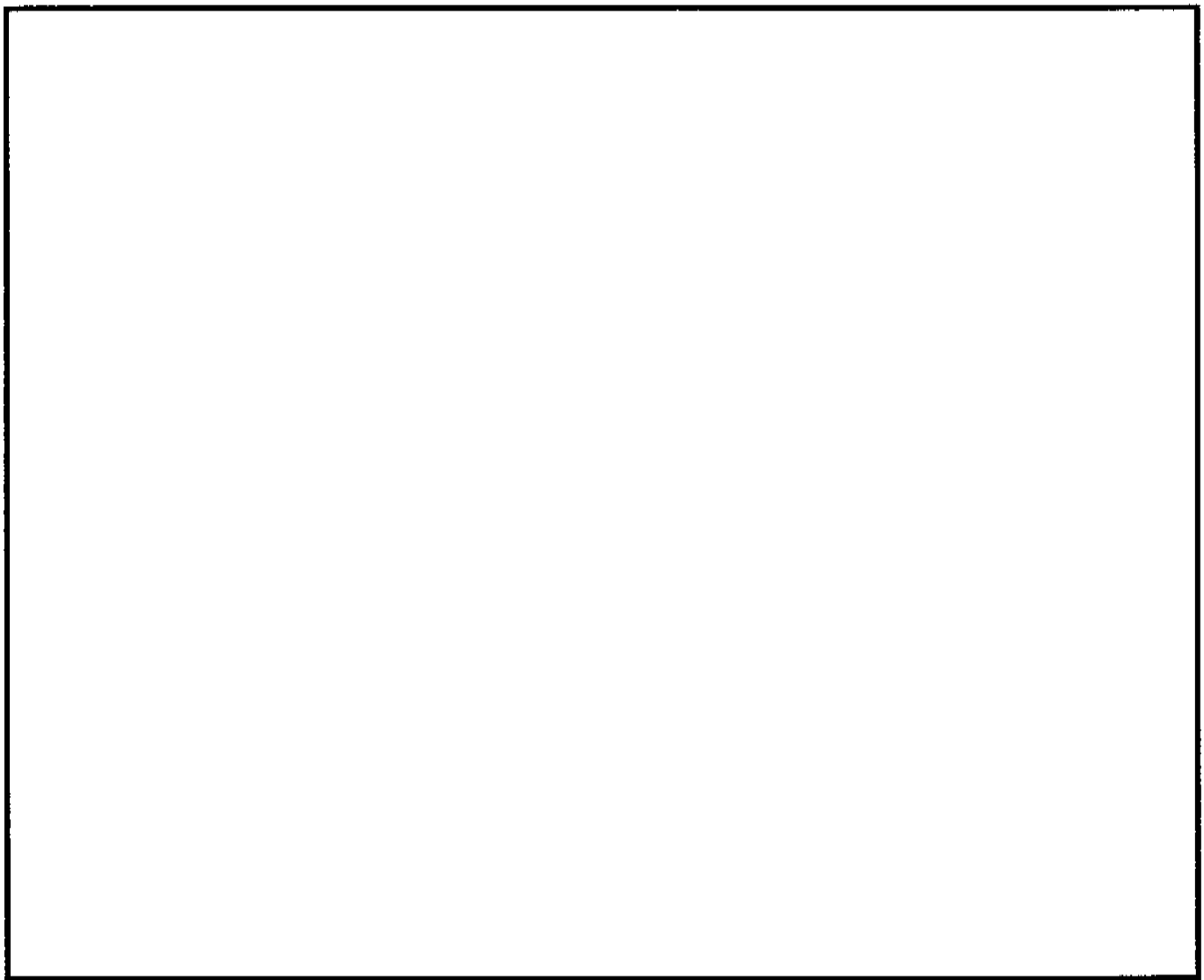


PLATE 9

Taking Data for Flake Attribute Analysis



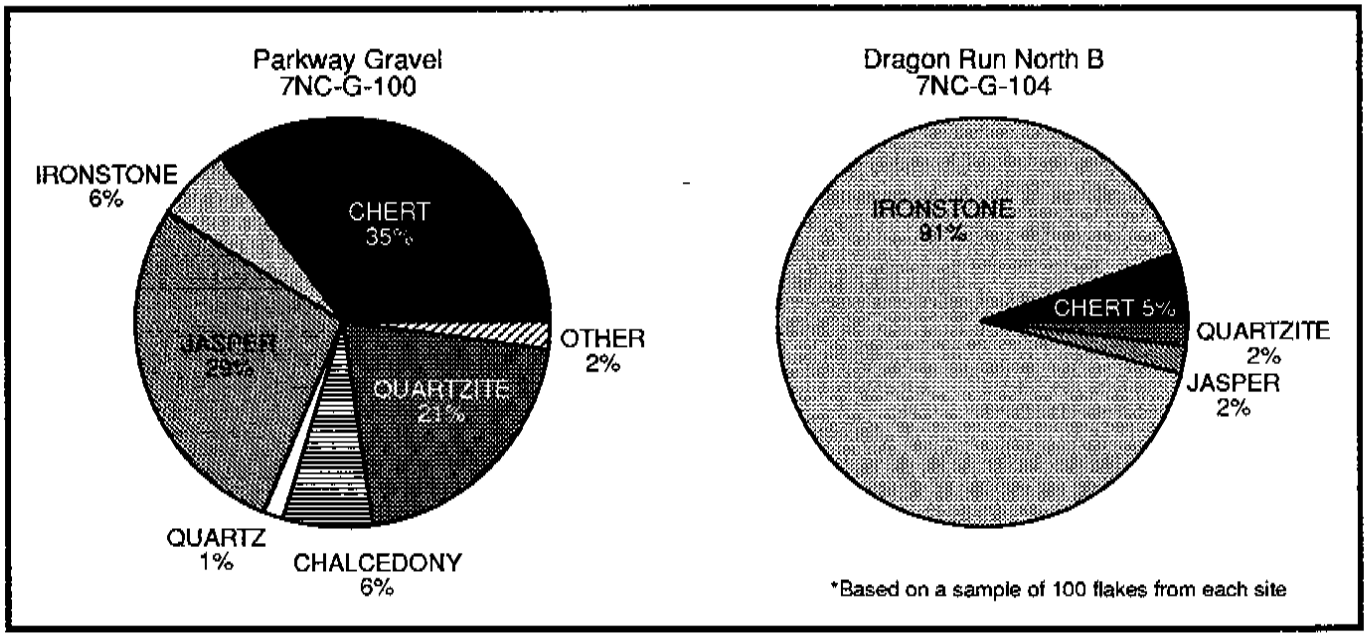
Edward Moyse measuring flake sizes in the lab. A whole sequence of observations are made on a sample of flakes from a site.

described by Ward (1985:37-42), at the Dragon Run North B site. This suggests that some preliminary reduction may have been done at the ironstone outcrops before raw materials were transported to campsites.

The larger size of ironstone flakes may be due, in part, to the tabular form in which ironstone naturally occurs. Angular raw material offers more immediate access for the knapper to better working angles and striking platforms conducive to larger flakes (Figure 31). On the other hand, the initial size of tabular ironstone raw materials may be larger than the size of cobbles available at sites like Parkway Gravel. This is another avenue for further research.

FIGURE 32

Flake Material Comparisons



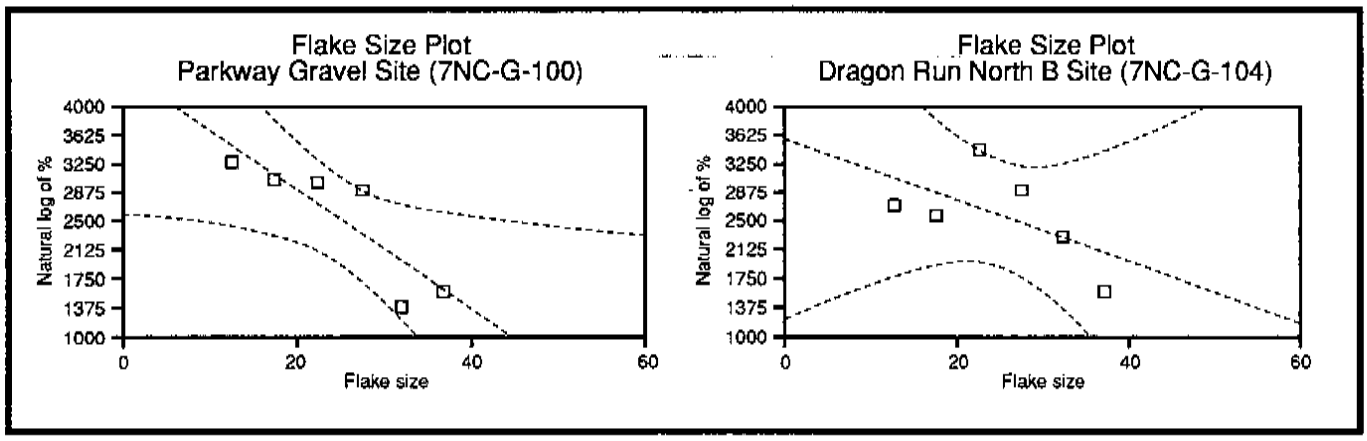
Flake Attribute Analysis

Flake attribute analysis (Plate 9) reveals contrasts between the Dragon Run North B site and the Parkway gravel site (Table 5). The mean Scar Counts differ at the 0.05 significance level, but the Direction Counts are not different at Alpha = 0.05. Both cobble core reduction and biface manufacture are indicated for the Parkway Gravel site. At the Dragon Run North B site, reduction of raw materials predominates over finishing of tools. However, the contrasts in raw materials between the two sites (Figure 32) makes it difficult to compare the flake attribute statistics because of the different flaking characteristics of various raw materials. Furthermore, the difference in starting form between cobbles and ironstone slabs confounds the comparisons. It may be productive to undertake attribute analysis by material type in order to compare the uses of different lithic raw materials.

Large samples of debitage would likely be recovered from further excavations at the Snapp and Wrangle Hill South sites. Lithic resources used at the Snapp site mirror those at Parkway Gravel, while the Wrangle Hill South site contains high percentage of ironstone. Flake attribute analysis of the collections from these sites could be used to further explore the issues raised here. Patterson (1990) showed that there is a characteristic slope to a plot of flake sizes produced from bifacial reduction. Plots of flake size distributions from the Parkway Gravel and Dragon Run North B sites (Figure 33) show the characteristic negative slope of bifacial reduction (more smaller

FIGURE 33

Regression Analysis of Flake Size Data



Flakes from the Parkway Gravel site tended to be smaller than those at the Dragon Run North B site as shown by the different slopes of the regression lines.

flakes than larger flakes). The plot for the Dragon Run North B site is much less steeply sloping than the plot for the Parkway Gravel site. The larger ironstone flakes at the Dragon Run North B site contribute to the difference. An earlier stage of reduction may be indicated at the Dragon Run site, or again the difference may be attributed to the raw material contrasts between the sites.

Flake attribute analysis for sites in the Dover area of the State Route 1 project (Riley et al. 1993) suggests that flake sizes decrease from north to south in Delaware as the size of available cobble raw materials decreases. However, the two sites reported here do not fit well into the trend. The Dragon Run North B site stands out especially. The slope of the linear regression line calculated for the Dragon Run North B site (see Figure 33) is lower (-0.08) than for any of the twelve other sites in Delaware for which Riley et al. (1993) present data. This result emphasizes the uniqueness of the Dragon Run North B site flake assemblage. The slope of the regression line for the Parkway Gravel site is -0.102, also a very low value that indicates large flakes and cobble reduction.

NATIONAL REGISTER ELIGIBLE SITES

Wrangle Hill South Prehistoric Site

The Wrangle Hill South Prehistoric site (7NC-G-105) is significant for four reasons. The first is the abundance of subsurface features at the site. Three pit features were located during Phase II testing. It is estimated that 70 features are present in the core area of the site — one feature for every 5.7 square meters (400 square meters/70 features). The second reason is the presence of

an area of intact soils that covers an estimated 15 square meters. The third reason is the presence of Nassawango ceramic artifacts on the site. This type of pottery is better known from further south in Delaware where it is associated with Delmarva Adena occupations. Finally, the presence of a large percentage of ironstone flakes in the debitage from the site is unusual, as discussed previously.

Snapp Prehistoric Site

The Snapp Prehistoric site is a large site suggesting intensive occupation. The abundance of fire-cracked rock on the site suggests household activities, and the features also suggest domestic activities. This contrasts sharply with the ephemeral procurement sites and other short-term occupations in the region. The site represents a Woodland I, Clyde Farm Complex, macro-band base camp. Testing revealed the presence of unplowed soils that are rare in northern Delaware. The site has a high potential of yielding important information on the Woodland I Period. As noted above, the site will yield a larger sample of debitage as well as a wide range of tools. Analysis will allow the exploration of lithic procurement and technology, and questions of trade and exchange in the region. The site can be compared to other Clyde Farm Complex sites further north such as the Clyde Farm site (Custer, Bachman, and Grettler 1986) and the Delaware Park site (Thomas 1980). The Snapp site is situated in a transitional zone where the Upper Coastal Plain slopes down to the Lower Coastal Plain. Prehistoric culture complexes show regional variation (Custer 1989:185-192). The Snapp site is located where there is a gap in our knowledge of the prehistory of the Delmarva Peninsula.

Woodville Farm Historical Site

The Woodville Farm site was occupied from the beginning of the nineteenth century until the late twentieth century. The site was owner-occupied for a time and tenant-occupied at other times. During the time of occupation, the fortunes of agriculture in northern Delaware fluctuated and the fortunes of the owners and occupants waxed and waned in response. The site prospered for a time, but was seized in default later. Recently the area has seen the decline of agricultural land use and increasing suburbanization and industrialization. The site figures little in the political history of the region; the major players are hardly mentioned in the history books except to note the exploits of real estate broker, William Bright, who foreclosed on the Penningtons (Scharf 1888:690,740,809-810,1219). Yet, the farm participated in the processes of change and development in northern Delaware for over 170 years.

The fact that the farmers who worked the land did not end up in the history books is precisely why the archaeological study of such sites is so important. The Woodville Farm site preserves important information on the everyday lives of its occupants. A variety of features document the domestic and agricultural activities on the site, and architectural remains document the construction and subsequent growth and evolution of the house itself.

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APPENDIX I

PHASE II TOTAL ARTIFACT COUNTS

Complete artifact counts with provenience and typological information will be provided upon request:

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